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# ICONES PLANTARUM FORMOSANARUM

NEC NON ET

CONTRIBUTIONES AD FLORAM  
FORMOSANAM

VI

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AUCTORE

**Bunzo Hayata**



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TO HIS EXCELLENCY BARON TEIBI ANDO,  
GOVERNOR GENERAL OF FORMOSA.

SIR,

I have the honour to submit to your Excellency the sixth  
volume of the *Icones Plantarum Formosanarum, nec non et Con*  
*tributiones ad Floram Formosanam* by BUNZŌ HAYATA, D. Sc.

HIROSHI SHIMOMURA,

CIVIL GOVERNOR OF FORMOSA.

September 1, 1916, Taihoku.





## INTRODUCTION.

As was announced in the introduction of third volume of this work, the present volume is principally devoted to the fourth part of those studies which have for the most part been upon new material, collected since 1912.

The volume contains studies on 212 species and 6 varieties ranging from the Berberideæ down to the Polypodiaceæ. All the species of phanerogamous plants are here arranged, as in the preceding volumes, after the system of BENTHAM and HOOKER; while those of vascular cryptogams are arranged after the system of ENGLER and PRANTL. Of the species and varieties mentioned in this work, 126 are proposed as new species and 6 are regarded as new varieties of known species, while 86 are identified with species which were already known as from Formosa or from other countries. One genus, *Parasitipomaea*, is proposed as a new, while 9 genera are mentioned as new to the flora of the island. The latter genera are as follows:

<i>Nuphar</i>	<i>Gardneria</i>	<i>Myrmechis</i>
<i>Picrasma</i>	<i>Acanthephippium</i>	<i>Gymnadenia</i>
<i>Gerbera</i>	<i>Vrydagzynia</i>	<i>Woodsia</i>

Species,\* genera\* and families\* now to be added to the flora of Formosa number as many as 121 species and 10 genera. Thus, up to the present date, the total number of species of the flora, so far as known, is 3446 species belonging to 954 genera and 160 families.

Finally, I avail myself of this opportunity to tender my hearty thanks to the officials of the Government of Formosa, to whom I am much indebted for help in the collection of material and in the publication of this work.

B. HAYATA.

December 1916, Taihoku and Tōkyō.

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\* It should be understood that plants outside of the island are not counted in this number, although they are mentioned in this volume.



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## Contributions to the Flora of Formosa.

## IV.

## Berberideæ.

*Mahonia* Nutt.

***Mahonia oiwakensis*** HAYATA sp. nov. Arborescens circ. 10 m. alta. Rami recti teretes apicem versus 1 cm. in diametro sectionis, cortice cinereo suberiformi, cicatricibus foliorum elevatis linearibus transverse dispositis. Folia versus apicem ramulorum approximativissime disposita radiatim divaricata pinnata in ambitu obovato-oblanccolata vel oblanceolata 25–40 cm. longa 10–20 cm. lata subsessilia supra medio latissima inferiore in ambitu gradatim usque ad basin attenuata, pinnis 12–14-jugis oppositis vel superiore subalternis, jugis inferioribus quam iis superioribus remotioribus, pinnis infimis ovatis  $1\frac{1}{2}$ – $2\frac{1}{2}$  cm. longis 7–15 mm. latis margine 1–2-aristato-dentatis, pinnis superioribus gradatim majoribus angustioribus longioribus; pinnis longissimis lanceolatis 8–10 cm. longis 14–20 mm. latis apice acuminatissimis basi cordato-rotundatis plus minus obliquis sessilibus margine tenuiter leviterque 1–3 dentibus instructis, dentibus interdum ad aristam  $\frac{1}{2}$  mm. longam reductis, aristis ascendentibus, coriaceis supra nitidis subtus pallidis, costa supra tenuiter impressa subtus elevata, nervis lateralibus supra hand distinctis vel vix elevatis subtus tenuiter elevatis, 5-nerviis utroque glabris; nodis jugarum leviter tumidis articulatis, rhachibus supra subtusque planis latere profunde sulcatis; jugis inferioribus a se  $2\frac{1}{2}$ –4 cm. remotis; rhachibus ad basin subito valde dilatatis 8–10 mm. latis; pinna terminalis quam pinnis lateralibus longior longissima linearis vel lineari-lanceolata integra vel dentibus 1–2 instructa. Racemi floriferi non visi; fructiferi ad apicem ramorum dense congesti erecti recti 9 cm. longi, bracteis oblongo-triangularibus  $3\frac{1}{2}$  mm. longis 2 mm. latis apice acutis basi leviter ventricosus patentissimis, pedicellis brevissimis 2 mm. longis. Bacca purpureo-nigricans glaucescens conico-ovoidea 9 mm. longa 6 mm. lata apice oblique acuta breve attenuata reliquis stigmatibus apiculata 2–sperma. Semina ellipsoidea  $4\frac{1}{2}$  mm. longa  $2\frac{1}{2}$  mm. lata utrinque obtusa, testa nigricanti.



HAB. Musha Oiwake, leg. B. HAYATA, Mai. 1916; Gökwanzan, leg. U. MORI, Feb. 1910.

Near *M. lomariifolia* TAK., but differs from it in the much narrower leaflets which are less spinous at the margin and have the less elevated veinlets.

## Nymphæaceæ.

### *Nuphar* SM.

**Nuphar Shimadai** HAYATA sp. nov. (Pl. I.) Herba aquatica; rhizoma crassum repens subteres 1 cm. in diametro sectionis sursum radiferum, radicibus teretibus incrassatis 3 mm. in diametro sectionis. Folia circum rhizoma spiraliter disposita longe petiolata, lamina in ambitu oblonga vel ovata (ab apicem laminae usque ad apicem auriculæ) 8–10 cm. longa 7–8 cm. lata apice perfecte rotundata basi sagittato-cordata (lobis cordis subtriangularibus 3–4 cm. longis apice obtusissimis) margine subintegra supra in exsiccato minute muricato-scabriuscula glabra subtus versus medium paucè versus marginem densissime hirsuta, costis supra haud visis subtus leviter elevatis, venis lateralibus radiatim divaricatis supra haud subtus distincte visis tenuissimis, subcoriacea, petiolis 15–30 cm. longis basi dilatatis. Scapus 25–40 cm. longus teres 3–3½ mm. in diametro sectionis erectus. Flores flavi solitarii terminales. Sepala 5 obovata vel spathulato-obovata plus minus inaequalia majora 2 cm. longa 13 mm. lata apice late rotundata vel emarginata basi angustata ad insertionem 3 mm. lata vel latiora, exteriora minora plus crassa interiora majora tenuissime membranacea. Petala  $\infty$  breviora staminodiiformia 6 mm. longa 2½–3 mm. lata dorso complanata obovato-quadranguliformia apice truncata vel emarginata. Stamina  $\infty$  cum antheris 1 cm. longa, filamentis dorso complanatis 8 mm. longis 1 mm. latis glabris, antheris quadranguliformibus 2½ mm. longis 1½ mm. latis apice truncatis, loculis 2 linearibus introrsis a se ⅔ mm. distantibus. Ovarium semi-rotundato-coniforme 3–4 mm. longum 7 mm. latum glabrum apice ad stylum 1–2 mm. longum abeuns, stylo apice 10-fido, segmentis 2 mm. longis exteriore recurvis apice acutis facie interiore prominente 1-carinatis ad carinas stigmatosis. Bacca late globosa 17 mm. longa 20 mm. lata apice stigmatè coronata. Semina globoso-ovoidea 4 mm. longa 3 mm. lata apice obtusa basi rotundata, testa crustacea fusco-castanea; albumen osseum sucineum semipellucidum. Embryo teres centralis.

HAB. Shiuchikuchō: Shimpo, leg. Y. SHIMADA, Dec. 1915. (Fl. et fr.)

Very near *Nuphar nipponicum* MAKINO, but differs from it in having more rounded leaves which are much hirsute on the under surface.

## Violaceæ.

### *Viola* LINN.

***Viola Tayemonii*** HAYATA sp. nov. Caulis cum flore terminali circ. 8 cm. longus simplex haud ramosus glaber erectus. Folia radicalia ignota. Folia caulina 2 alternatim sita glabra petiolata late reniformia 18 mm. lata 8 mm. longa apice late rotundata vel plus minus acuta basi profunde reniformia margine serrulata, (serrulis ascendentibus recurvis latere inferiore 2 mm. longis latere superiore  $\frac{1}{3}$  mm. longis apice glanduliferis, glandulis rubris), utraque pagine atro-viridissima, supra venis venulis decoloratis distincte visis, supra hirsuta subtus glabra, petiolis 1-1 $\frac{1}{2}$  cm. longis glabris, stipulis lineari-oblongis glabris supra hirsutis subtus glabris 4-6 mm. longis 1 $\frac{1}{2}$ -2 mm. latis. Flores flavi terminales pedunculati, pedunculis 3 cm. longis glabris erectis. Sepala oblongo-linearum 4 $\frac{1}{2}$  mm. longa 1 $\frac{1}{4}$  mm. lata apice obtusa integra margine ciliolata pagine utraque subglabra; petala et stamina ignota.

HAB. Taihasenzan, ad 11000 ped. alt., leg. Tayemon Itō, Jun. 1915.

Near *Viola biflora* LINN. var. *crassifolia* MAKINO, but differs from it in having much smaller leaves and flowers.

***Viola senzanensis*** HAYATA sp. nov. Rhizoma erectum. Folia omnia radicalia longe petiolata utraque glabra triangulari-cordata 8 mm. longa 10 mm. lata apice triangulari-obtusa basi reniforme cordata margine remote serrulata, (serrulis a se 2 mm. remotis brevissimis latere superiore  $\frac{1}{4}$  mm. longis latere inferiore 2 mm. longis apice callo uno rubro instructis), supra viridia venis venulis haud visis, petiolis 2-3 cm. longis glabris, stipulis lineari-lanceolatis 2-3 mm. longis 1 mm. latis paucissime laciniato-serratis vel integris. Scapus 3 cm. longus glaber medio bracteis singulis vel duabus instructus, bracteis linearibus 2 mm. longis acuminatis. Flores 7 mm. longi. Sepala lineari-lanceolata. Antheræ lineari-oblongæ 1 mm. longæ  $\frac{2}{3}$  mm. latæ subsessiles, appendiculis connectivorum ovatis 1 $\frac{2}{3}$  mm. longis 1 mm. latis apice obtusis basi subtruncatis rubescentibus membranaceis. Cæterum ignoti.

HAB. Taihasenzan, ad 11000 ped. alt., leg. TAYEMON ITŌ, Jun. 1915.

Remarkable for the very small leaves.

### Ternstroëmiaceæ.

#### *Adinandra* JACK.

**Adinandra lasiostyla** HAYATA Mater. Fl. Formos. p. 42. Descriptio aucta:—Flores axillares solitarii, pedicellis 1 cm. longis villosis basi bracteis 2 instructis, bracteis minutis caducis oblongo-triangularibus  $1\frac{1}{2}$  mm. longis  $\frac{3}{4}$  mm. latis apice obtusis extus pilosis intus glabris. Sepala 5 rotundato-ovata  $4\frac{1}{2}$  mm. longa 4 mm. lata apice obtusissima basi haud vel vix contracta margine dense ciliolata dorso prope medium pilosa crassiuscula versus marginem glabra intus glabra imbricata. Petala 5 imbricata ovato-rotundata 4 mm. longa totiusque lata apice triangulari-obtusa basi plus minus contracta margine crenulato-denticulata dorso medio crassiuscula pilosa versus marginem tenuia glabra intus toto glabra. Stamina circ. 20, filamentis  $\frac{1}{2}$  mm. longis glabris complanatis antheris lineari-lanceolatis 2 mm. longis  $\frac{1}{2}$  mm. latis apice acuminatis basi obtusi, extus plus dense intus minus dense pilosis, pilis 1 mm. longis ascendento-erectis, loculis 2 introrsum dehiscentibus. Ovarium pilosum cum stylo conico-columniforme cum stylo 3 mm. longum  $\frac{3}{4}$  mm. latum basi densissime sursum sparse pilosum, stylo  $1\frac{1}{2}$  mm. longo glabro apice brevissime 3-lobato.

HAB. Arisan, ad 2500 m. alt., leg. U. FAURIE, Junio 1914, (No. 1055).

This form is distinguishable from the type in having quite glabrous styles. It may be questioned, however, that this form is a male one of the original.

### Geraniaceæ.

#### *Impatiens* LINN.

**Impatiens Tayemonii** HAYATA sp. nov. Caulis erectus rectus glaber 40 cm. altus. Folia alterna membranacea oblonga circ. 10 cm. longa  $4\frac{1}{4}$  cm. lata apice acuminata basi cuneato-obtusa margine serrata, serris ascendentibus 3-4 mm. latis totiusque longis apice truncatis et emarginatis ad centrum apiculatis, apiculis  $\frac{1}{2}$  mm. longis erectis rectis, venis lateralibus ad apicem serrularum haud attingentibus, utraque glabra, petiolis 1-2 mm. longis, stipulis nullis. Flores majusculi flavi ad axillas foliorum superiorum solitarii, pedunculis



gracilibus  $2\frac{1}{2}$  cm. longis versus apicem 1-bracteatis, bracteis minutis. Sepala 3; lateralia 2 ovato-rotundata 1 cm. longa 8 mm. lata apice recurvo-apiculata basi rotundata; posticum 1 longe saccatum apice ad orem cuspidato-acutum, ore plus minus obliquo 18 mm. in diametro, sacco obconico 2 cm. longo (calcare excepto)  $1\frac{1}{2}$  cm. lato basi acuto ad calcare lineare abeunti, calcare ascendento-recurvo lineari 8 mm. longo 1 mm. lato ad extremitatem 2-fido, ramis 2 mm. longis. Petala 3: vexillum in plicato 8 mm. latum in explicato 16 mm. latum 6 mm. longum (in plicato oblique semi-rotundatum) apice emarginatum apiculatum, apiculis 1 mm. longis deorsum productis; alæ semi-oblongæ 2 cm. longæ 1 cm. latæ latere posteriore (superiore) lobis singulis instructæ, lobis 4 mm. longis 5 mm. latis semi-rotundatis acutis apiculatis, apiculis 2 mm. longis deorsum recurvis. Stamina 5, filamentis complanatis 3 mm. longis medio appendiculatis, appendiculis linearibus  $1\frac{1}{2}$  mm. longis, antheris circum pistillum coherentibus late rotundatis. Ovarium lineare cum stylo brevissimo 4 mm. longum  $1\frac{1}{2}$  mm. latum apice cum stylo obtusum 5-costatum.

HAB. Taihasenzan, ad 7000 ped. alt., leg. TAYEMON ITÔ, Junio 1915.

Near *I. Noli-tangere* LINN., but differs from it in having more minutely serrate leaves tipped with a small tail.

## Rutaceæ.

### *Evodia* FORST.

***Evodia hirsutifolia*** HAYATA sp. nov. Frutex? Ramuli fusco-purpurascences. Folia opposita in ambitu lanceolata generaliter 9–11-foliolata, foliolo terminali maximo elongato-oblongo 10 cm. longo  $3\frac{1}{2}$  cm. lato apice acuminato basi acuminato membranaceo-chartaceo margine integro ntraque pagine tenuiter brevissime hirsuto, costa supra subtusque tenuiter elevata, venis lateralibus primariis ntraque pagine tenuiter elevatis hirsutis utroque latere costæ 15–18 subrectis angulo obtusissimo a costa divaricatis, in exsiccato supra fuscenti subtus pallido subtus minute pauce rufo-fusco-punctato, petiolulo terminali 13 mm. longo; foliolis lateralibus oppositis ovatis vel ovato-lanceolatis inferioribus gradatim minoribus, infimis minimis basi plus minus obliquis, superioribus subsessilibus, inferioribus breve petiolulatis, petiolis communibus 3–4 cm. longis cum rhachibus haud alatis brevissime hirsutis. Cymæ axillares

vel terminales, fructiferae cum pedunculis 6 cm. longae 8-9 cm. latae, ramis oppositis transverse divaricatis; pedunculis  $2\frac{1}{2}$  cm. longis hirsutis. Fructus folliculifer 6 mm. longus 11 mm. in diametro generaliter 5-carpellaris, carpellis basi connatis obovatis apice rotundatis basi acutis dorso rotundato-convexis latere planis latere leviter compressis dorso grosse tuberculatis latere laevibus. Semina ellipsoidea  $3\frac{1}{2}$  mm. longa 3 mm. lata nitida nigerrima.

HAB. Rinkihō, leg. H. INABA, 1911, Aug.

Near *Erodia meliæfolia* BENTH., but differs from it in having thinly hairy leaves and cymes.

**Evodia meliæfolia** BENTH.; MATSUM. et HAYATA Enum. Pl. Formos. p. 69. Frutex. Ramuli fuscentes lenticellis elevatis rotundatis minutis notati. Folia opposita in ambitu lanceolata vel ovata cum petiolis 10-20 cm. longa 9-12 cm. lata 5-11-foliolata, foliolis subæqualibus, foliolo terminali ovato-lanceolato  $5\frac{1}{2}$  cm. longo  $2\frac{1}{2}$  cm. lato apice caudato-acuminato basi obtuso æquali vel plus minus obliquo ad summum obtuso margine subintegro supra in exsiccatō fuscenti subtus plus minus albicanti, costa supra tenuiter subtus distincte elevata, venis lateralibus tenuissimis, petiolulo circ. 1 cm. longo; foliolis lateralibus oppositis ovato-lanceolatis basi valde obliquis latere superiore 12 mm. lato latere inferiore 8 mm. lato, petiolulis 8 mm. longis; petiolis communibus 4 cm. longis. Flores non visi. Cymæ ad axillas foliorum superiorum vel terminales cum pedunculis  $5\frac{1}{2}$  cm. longae totiusque latae trichotome ramosae dense fructiferae, pedunculis 3 cm. longis. Fructus folliculiformis depressus 3 mm. longus 7 mm. in diametro 3-5-carpellaris, carpellis subdistinctis subglobosis latere compressis dorso rugosissimis latere sublævibus sutura ventrali dehiscentibus, endocarpis et exocarpis demum solutis, endocarpis cartilagineis. Semina ellipsoidea  $2\frac{1}{2}$  mm. longa 2 mm. lata apice obtusa basi rotundata latere uno cicatricibus linearibus hilorum notata, testa osseo-crustacea nitidissima nigerrima; albumen carnosum; embryo amplus, cotyledonibus rotundato-ellipticis  $1\frac{1}{2}$  mm. longis, radicula brevissima  $\frac{1}{5}$  mm. longa.

HAB. in monte centralibus (Ahsien), ad 4000 ped. alt., leg. S. SASAKI, Jan. 1911.

### *Zanthoxylum* LINN.

**Zanthoxylum liukiense** HAYATA sp. nov. Frutex. Ramuli teretes

haud aculeati, cortice longitudinaliter ruguloso ad rugulos fissos haud vel vix lenticellato glabro. Folia alterna pari- vel impari-pinnata tenuiter coriacea in ambitu linearia cum petiolis 20 cm. longa 6 cm. lata 19–23-foliolata, foliolis superioribus majoribus inferioribus minoribus; foliolo terminali oblongo-lanceolato 4–4½ cm. longo 1½ cm. lato apice caudato-acuminato ad summum obtuso retuso basi acuto margine ereulato utraque pagine glabro, costa supra tenuiter impressa subtus elevata, venis primariis lateralibus supra haud subtus tenuiter elevatis utroque latere costae 7–8 subrectis, utraque glabro obscure minute punctato; foliolis lateralibus ovato-oblongis apice breve caudatis basi obliquis latere superiore obtusis vel rotundatis latere inferiore acutis vel obtusis a se 1½ cm. remotis; rhachibus angustissime alatis semi-teretibus, petiolis communibus 2 cm. longis glabris. Paniculae axillares 4 cm. longae 3 cm. latae, ramis divaricatis glabris apice flores subglomeratim gerentibus (pedicellis ultimis 1–2 mm. longis crassis basi bracteis minutis triangularibus acutis ½ mm. longis instructis). Flores ♂: sepala 4 triangularia apice obtusa basi haud contracta minus quam 1 mm. longa totiusque lata sub microscopio margine ciliolata utraque pagine glabra crassiuscula. Staminodia 4 triangulari-linearia ⅔ mm. longa ½ mm. lata haud antherifera. Ovarium tetramerum 1 mm. altum glabrum, carpellis subdistinctis octantiformibus, stylis 2 mm. longis validiusculis exteriore recurvis apice oblique stigmatiferis. Discus sub ovario insitus incrassatus 1 mm. longus totiusque latus.

HAB. Loo-choo, Nagodake, leg. G. NAKAHARA, Aprili. 1907.

Near *Z. cuspidatum* CHAMP., but distinguishable from it by the much more numerous and smaller leaflets and much shorter common petioles.

**Zanthoxylum acanthophyllum** HAYATA sp. nov. Frutex? ramossissimus; rami teretes glabri fulvo-cinerascentes, cortice tenuiter ruguloso lenticellis haud elevatis minutis albis hae atque illae notato; ramuli flexuosi alternatim foliati, utroque latere basis petiolorum spinis oppositis instructi, (spinis validissimis oppositis latere complanatis facie exteriore planis facie interiore subangulatis in sectione apice subulato-acutis basi triangulari-dilatatis circ. 1 cm. longis basi 6 mm. latis rectis a ramulo angulo circ. 90° egressis basi deorsum fulvescentibus sursum rubro-purpurascens nitidis). Folia rami annotini decidua majora 7-foliolata ambitu obovato-

oblonga vel oblonga cum petiolis 10 cm. longa 7 cm. lata, foliolo terminali obovato oblongo vel oblongo 5 cm. longo 2 cm. lato apice obtuso vel acuto basi obtuso vel cuneato basi integro excepto brevissime serrulato versus apicem crenulato, ad marginem tenuissime deorsum recurvo, pagine superiore glabro sed setulis 1 mm. longis ascendentibus consperso ad costas et venas haud setuloso, pagine inferiore glabro haud setuloso sed ad costas setuloso, costis et venis supra tenuissime impressis subtus elevatis, venis lateralibus primariis utroque latere costae 5-6 mediis a costa angulo  $50^{\circ}$  egressis subrectis ad marginem haud attingentibus, membranaceo vel chartaceo; foliolis lateralibus oppositis 3-jugis, jugis superrimis maximis quam foliolo terminali majoribus, jugis infimis minoribus, petiolis cum rhachibus a basi usque ad foliolum terminale  $5\frac{1}{2}$  cm. longis a latere complanatis supra late canaliculatis utroque latere canaliculorum angustissime elevato-alatis subtus minute setulosis, supra ad jugas superiores inter foliola lateralia seta validiuscula 5 mm. longa singula instructis, ad jugam infimam setula minuta singula instructis; inter-jugis 14 mm. longis, cum petiolulo terminali (i. e. partibus rachis inter foliolum terminale et jugam superrimam) æquilongis; foliis ramulorum lateralium floriferorum hornotinorum minoribus cum petiolo 3 cm. longis 2 cm. latis. Flores ♂ cymosi. Cymæ ad apicem ramulorum lateralium terminales subumbelliformes sessiles, ramis (vel radiis) 5-6,  $1\frac{1}{2}$  cm. longis glabris patentibus apice florem 5-6 umbellatim gerentibus, pedicellis ultimis 3 mm. longis basi articulatim deciduis basi bracteis singulis instructis, bracteis minutis subuliformibus 1 mm. longis. Sepala 5 inæqualia lanceolata vel lanceolato-triangularia 1 mm. longa apice lineariacuminata basi  $\frac{1}{3}$  mm. lata glabra. Petala 0. Stamina 4-5 sepalis opposita, filamentis  $1\frac{1}{2}$  mm. longis  $\frac{1}{5}$  mm. latis glabris, antheris apertientibus reniformibus in clauso ellipticis  $\frac{3}{4}$  mm. longis glabris apice emarginatis dorso apice globulis singulis instructis, globulis nigro-coloratis. Rudimentum ovarii (vel discus?) globoso-pulviniforme  $\frac{3}{4}$  mm. longum  $\frac{3}{4}$  mm. latum apice apiculis brevibus instructum. Fl. ♀ ignoti.

HAB. Takao, leg. S. SASAKI, Mart. 1910.

### *Fagara* LINN.

***Fagara cyrtorhachia*** HAYATA sp. nov. Frutex scandentissimus. Rami subrecti remotissime aculeolati, aculeis 4 mm. longis latere complanatis descen-

dento-recurvis, remote foliati, corticem exsiccatum fusco-cinerascenti longitudinaliter ruguloso minutissime lenticellato. Folia 7-17-foliolata in ambitu lanceolata, foliis oblongis vel lanceolatis lateralibus suboppositis vel alternis, infimis longissimis oblongo-ovatis 5 cm. longis 2 cm. latis apice acuminato-caudatis (ad summum caudæ obtusis) basi cuneato-acutis margine integris in exsiccatum supra subnitidis vel opacis fuscentibus subtus pallidioribus utroque glaberrimis, costa supra tenuiter impressa subtus elevata, venis lateralibus primariis supra vix subtus distincte elevatis gracillimis; foliolo terminali longissimo angustiore lanceolato 6 cm. longo 13 mm. lato, petiolulis 2 mm. longis supra sulcatis, rhachibus cum petiolis gracilibus arenatis aculeolatis supra sulcatis. Paniculae axillares 4-5 cm. longæ laxiuscule floriferae, rhachibus rectis minute hirsutis 4-quetris ad nodos glomeratim floriferis, vel floribus ad apicem ramorum paniculorum glomeratim pedicellatimque sitis, bracteis sub pedicello singulis, bracteolis duabus; bracteis cuspidato-triangularibus  $\frac{1}{2}$  mm. longis hirsutis; bracteolis subulatis minutis  $\frac{1}{2}$  mm. longis; pedicellis  $\frac{1}{2}$  mm. longis hirsutis articulatis a rhachide solutis. Fl. ♂: pallido-viridis. Sepala 5 triangularia 1- $\frac{2}{3}$  mm. longa et lata acuta utraque glabra margine plus minus breve hirsuta. Petala 5 elongato-oblonga 2 mm. longa 1 mm. lata apice obtusa basi leviter contracta margine subintegra sub microscopio minute denticulata utraque glabra. Stamina 5, filamentis 2 $\frac{1}{2}$  mm. longis glabris, antheris oblongo-sagittiformibus glabris  $\frac{2}{3}$  mm. longis  $\frac{1}{2}$  mm. latis apice obtusis basi sagittatis. Discus haud distinctus. Rudimentum ovarii depresso-globosum  $\frac{1}{3}$  mm. longum, stylis 2 oblongis  $\frac{1}{2}$  mm. longis. Fl. ♀: viridescens. Sepala ut fl. ♂. Petala ovata 2 $\frac{1}{2}$  mm. longa 1 $\frac{1}{2}$  mm. lata utraque pagine glabra apice obtusa basi leviter contracta margine sub microscopio minute ciliolata. Staninodia 5 minuta, antheris obsoletis. Discus pulviniformis in specimine exsiccatum indistinctus. Ovarium depresso-globosum 1 $\frac{1}{3}$  mm. longum totiusque latum glabrum, carpellis 4 (vel 5?) distinctis octantiformibus dorso minute impresso-punctatis, basi rotundatis apice abrupte ad stylum abeuntibus, stylis 1 $\frac{1}{2}$  mm. longis exteriore valde recurvatis apice subgloboso-dilatatis stigmatosis. Panicula fructifera pyramidalis 3-4 cm. longa. Fructus folliculiformis 4 mm. longus 11 mm. in diametro, carpellis depresso-globosis 6 $\frac{1}{2}$  mm. longis 6 mm. latis apice plus minus apiculatis latere leviter compressis. Semina ignota.



HAB. Mt. Arisan; inter Heishana et Nimandaira, leg. B. HAYATA, Aprili. 1914, (fr.); inter Funkiko et Taroyeu, leg. TAKEO ITÔ et B. HAYATA, Mart. 1914, (fl. ♀ et ♂).

*Fagara cyrtorhachia* and *F. leiorhachia* are contrasted by the leaves which are in the former 7-17 foliolate with smaller leaflets, but in the latter 5-foliolate with much larger leaflets.

***Fagara laxifoliolata*** HAYATA sp. nov. Frutex? rami et ramuli haud aculeati longitudinaliter rugulosi minute lenticellati. Folia alterna tenuiter coriacea pari-vel imparipinnata 7-9-foliolata in ambitu oblanceolata cum petiolis 2 cm. longis 20-25 cm. longa 8-9 cm. lata, foliolis superioribus majoribus, inferioribus minoribus, foliolo terminali cuspidato-obovato 8 cm. longo  $3\frac{1}{2}$  cm. lato apice breve subito cuspidato-caudato ad summum tenuiter retuso basi subito acuminato margine integro tenuiter desuper excurvato utraque glabro supra nitido, costa supra valde impressa subtus prominenti, venis primariis lateralibus utraque pagine tenuiter sed distincte elevatis venulis supra elevatis distincte reticulatis sed subtus vix visis, venis rectis, petiolulo 2 cm. longo; foliolis lateralibus basi obliquis acutis, petiolulis 1 mm. longis sulcatis; foliolis a se 3 cm. remotis, rhachibus petiolisque et petiolulisque supra sulcatis; petiolis communibus 2 cm. longis. Paniculae axillares 5-7 cm. longae in ambitu pyramidales abundanter floriferae, rhachibus pedicellisque hirsutis, pedicellis ultimis 2-3 mm. longis basi articulatis solutis, bracteis minutis triangularibus  $\frac{3}{4}$  mm. longis totiusque latis acutis margine minute ciliatis. Flores ♀. Sepala 4, triangularia  $\frac{3}{4}$  mm. longa  $\frac{3}{4}$  mm. lata apice acuta vel obtusa utraque glabra margine sub lente ciliolata. Petala 4 oblonga 3 mm. longa 2 mm. lata apice obtusa basi plus minus contracta margine sub microscopio minute crenulata utraque glabra. Staminodia nulla vel minuta squamiformia. Ovarium 4-merum, carpellis subdistinctis quadrantiformibus  $1\frac{1}{2}$  mm. longis dorso impresso-punctatis, stylis 1 mm. longis stigmatibus globosis oblique sitis. Discus (vel torus?) sub ovario insitus  $\frac{1}{2}$  mm. longus pulviniformis.

HAB. Mt. Shiehseitonzan, leg. Y. SHIMADA, Aprili. 1911.

Near *F. Avicennae* DC. (BENTH. Fl. Hongk. p. 58), but differs from it by the 4-carpelled flowers and obtusely cuspidate leaflets.

***Fagara leiorhachia*** HAYATA sp. nov. Frutex scandentissimus. Rami

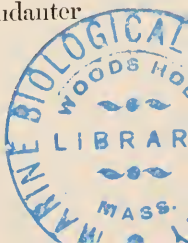
recti teretes fusco-cinerascentes, cortice longitudinaliter ruguloso lenticellis minutissimis notato. Folia 5-foliolata in ambitu obovata 14 cm. longa 12 cm. lata, foliolis infinis minimis, foliolo terminali maximo obovato vel oblongo 8 cm. longo 3 cm. lato apice longe caudato basi cuneato ad summum obtuso vel minute retuso supra subnitido, costa supra tenuiter impressa subtus elevata, venis primariis lateralibus supra tenuiter minus subtus distincte elevatis gracilibus rectis angulo obtusissimo divaricatis, margine tenuiter desuper recurvo, supra fusco subtus pallido utraque glabro (petiolulo  $1\frac{1}{2}$  cm. longo); foliolis lateralibus alternis vel suboppositis; petiolulis 6 mm. longis; rhachibus cum petiolis supra planis vel sub-sulcatis; petiolis communibus  $3\frac{1}{2}$  cm. longis; rhachis foliorum haud vel vix aculeolata. Flores ignoti. Panicula fructifera axillaris vel terminalis densissime fructifera. Fructus folliculiformis 6 mm. longus 12 mm. in diametro 3-4- vel 5-carpellaris, carpellis distinctis oblongo-subglobosis apice apiculatis 7 mm. longis  $5\frac{1}{2}$  mm. latis latere leviter compressis extus rugulosis, endocarpiis cartilagineis; semina ignota.

HAB. Mt. Arisan, inter Heishana et Funkiko, leg. B. HAYATA, April. 1914, (fr.).

Near *P. lavifoliolata*, but differs from it in having 3-5-foliolate leaves.

***Muraya* LINN.**

***Muraya euchrestifolia* HAYATA sp. nov.** Frutex? Rami fusco-cinerascentes longitudinaliter minute rugulosi minute lenticellati, ramulis sursum tenuiter hirsutis. Folia abrupte (semper?) pinnata 4-8-foliolata cum petiolis 20-25 cm. longa in ambitu obovata tenuiter coriacea vel chartacea, foliolis superioribus majoribus inferioribus minoribus; foliolis superioribus elongato-oblongis 7-8 cm. longis  $2\frac{1}{2}$ -3 cm. latis apice acuminatis ad summum obtusis basi acutis margine subintegris tenuiter desuper recurvis, costa supra minus subtus plus elevata, venis lateralibus primariis utroque latere costae 5-7 rectis a costa angulo  $45^{\circ}$ - $50^{\circ}$  egressis sursum ramosis utraque pagine tenuissime elevatis, pagine supra viridibus subtus pallidis minute paucisque nigro-punctatis utraque glabris, petiolulis 3 mm. longis, foliolis inferioribus minoribus circ. 5 cm. longis; foliolis suboppositis vel alternis a se  $3\frac{1}{2}$  cm. distantibus; petiolis communibus  $3\frac{1}{2}$  cm. longis interjugam æquantibus cum rhachibus teretibus glabris nigro-punctatis. Flores ignoti. Cymæ terminales 8 cm. longæ 13 cm. latæ abundanter



fructifera, ramis divaricatis. Fructus perfecte globosus 1 cm. in diametro glaber haud rugosus sublaevis minute nigro-punctatus, punctis plus minus elevatis, pericarpis tenuiter crassiusculis. Semina obovoideo-subglobosa 8 mm. longa totiusque lata, testa tenuiter membranacea; albumen O; embryo amplius, cotyledonibus crassissimis obovato-rotundatis 8 mm. longis totiusque latis 3 mm. crassis, radicula infra minutissima punctiformi 1 mm. longa inter cotyledones sita.

HAB. Nantō: Baikai, leg. TAYEMON Itō, Jan. 1914.

Near *M. Koenigii*, but differs from it in having much looser inflorescence and crimson-red fruits. *M. Koenigii* has much denser flowers and black fruits.

***Clausena* BURM.**

***Clausena tetramera* HAYATA sp. nov.** Frutex? Rami et ramuli teretes fuscentes longitudinaliter minute rugulosi minute lenticellati minute sparse hirsuti. Folia alterna chartacea pinnata in ambitu oblonga cum petiolis 25–30 cm. longa 10–14 cm. lata, foliolis superioribus majoribus; foliolo terminali leviter minore caudato-ovato  $6\frac{1}{2}$  cm. longo  $2\frac{1}{2}$  cm. lato apice caudato-acuminato ad summum obtuso basi late cuneato margine subintegro vel crenulato, costa supra tenuissime subtus prominente elevata, venis lateralibus primariis utroque latere {costae 9–11 ramosis sursum arenatis supra haud subtus tenuiter elevatis cum costa rubro-coloratis, supra subglabro subtus ad costas et venas laterales tenuiter hirsuto; foliolis lateralibus oblique lanceolatis 8 cm. longis  $2\frac{1}{2}$  cm. latis apice acuminatis basi latere superiore late aentis latere inferiore angustissime cuneatis a se  $2\frac{1}{2}$ –3 cm. remotis, petiolulis 5 mm. longis; petiolis communibus 4 cm. longis. Paniculae terminales 20 cm. longae 15 cm. latae floribundae a basi ramosae tenuiter hirsutae, ramis divaricatis, floribus ad apicem ramuli paniculae cymose sitis; rhachibus pedicellisque hirsutis; pedicellis ultimis 1 mm. longis basi articulatum solutis, bracteis minutis hirsutis oblongis  $\frac{1}{2}$  mm. longis. Calyx brevissime obconicus subplanus 4-lobatus, lobis semi-rotundato-triangularibus  $\frac{1}{3}$  mm. longis breve cuspidatis extus rugosis intus levibus margine apice ciliolatis vel haud ciliolatis. Petala 4 oblonga 3 mm. longa 2 mm. lata apice obtusa integra glabra extus plus minus punctato-tuberculata intus levia. Stamina 8, filamentis basi dilatatis apice filiformibus, partibus dilatatis oblongo-quadrangularibus  $\frac{4}{5}$  mm. longis  $\frac{2}{3}$  mm. latis incrassatis apice interiore ad calcar productis glabris, partibus filiformibus 1 mm. longis glabris, antheris

dorsifixis oblongis  $1\frac{1}{3}$  mm. longis apice obtusis leviter retusis basi sagittatis interiore deliscentibus. Ovarium oblongum dense tuberculatum barbatum 1 mm. longum stipitatum, stipite  $\frac{1}{2}$  mm. longo glabro, stylo glabro columnari crasso 1 mm. longo  $\frac{1}{2}$  mm. lato apice perfecte truncato stigmatoso.

HAB. Hainan, leg. Z. KATSUMADA, 1910.

Near *Clausena Wampi*, but differs from it by the less hairy ovary and much dilated filaments.

### *Citrus* LINN.

***Citrus erythrocarpa*** HAYATA sp. nov. *Fortunella erythrocarpa* HAYATA. Frutex. Rami et ramuli graciles cinerascetes longitudinaliter tenuiter rugulosi. Folia alterna trifoliolata vel simplicia chartacea, foliolis ovato-lanceolatis vel lanceolatis 7 cm. longis  $2\frac{1}{2}$  cm. latis apice acuminatis sed ad summum obtusis basi acuminatis margine integris utraque pagine glabris, costa supra tenuiter impressa subtus elevata, pellucido-punctatis, venis venulisque supra tenuiter vel obscure subtus distincte elevatis. Flores ignoti. Cymæ terminales 2–3 cm. longæ. Fructus drupiformis ellipsoideus 15 mm. longus 10 mm. latus apice brevissime apiculatus lævis glaber 1-spermus rubescens, pericarpis crassiusculis tenuibus. Semina solitaria ellipsoidea 13 mm. longa 8 mm. lata apice brevissime apiculata basi rotundata, testa rubescenti membranacea latere uno arillis linearibus ramosis adnatis instructa. Albumen O; embryo amplius ellipsoideus, cotyledonibus ellipticis 10 mm. longis 6 mm. latis crassissimis minute punctatis osseis; radícula brevissima truncata ad centrum minute impressa brevissime rubro-hirsuta.

HAB. inter Karapin et Snisharyō, leg. B. HAYATA, Aprili. 1914, (fr.).

Near *Citrus japonica* in the 1-seeded fruits, but differs from it in having shortly apiculate elliptical fruits and 3-foliolate leaves.

### Simarubeæ.

#### *Picrasma* BLUME.

***Picrasma quassioides*** BENN.; BENTH. Fl. Hongk. p. 61; Hook. f. Fl. Brit. Ind. I. p. 520; HEMSLE. Ind. Fl. Sin. I. p. 112; MATSUM. Ind. Pl. Jap. II.-2 p. 296.

HAB. Hōgō, Musha, ad 4000 ped. alt., leg. B. HAYATA, Aprili. 1916, (♂ et ♀).

Compared with a Japanese specimen so named in the Herbarium at Tōkyō. Petals of female flowers of the Formosan are acuter and more hairy than those of the Japanese.

## Celastrineæ.

### *Celastrus* LINN.

**Celastrus elevativena** HAYATA sp. nov. Frutex scandentissimus, ramis et ramulis gracilibus interdum volubilibus fuscentibus cortice longitudinaliter elevato-striatis lenticellatis, lenticellis rotundatis. Folia alterna oblonga lanceolata vel obovato-oblonga  $1\frac{1}{2}$ –5 cm. longa 12–23 mm. lata apice acuta basi obtusa vel acuta margine minute serrulata coriacea, costis venis venulisque utroque pagine elevatis, utroque pagine glabra, petiolis 2–8 mm. longis. Capsulæ axillares solitarie vel geminae, pedicellis 5–6 cm. longis rectis divaricatis, 3-valvatae, valvis viridibus crasse coriaceis extus transverse rugulosis tenuissime grosse reticulatis rotundatis 6 mm. in diametro apice reliquis styli apiculatis. Semina matura ignota.

HAB. Kwarenkō, leg. U. FAURIE.

Near *C. leiocarpa* HAYATA, but differs from it in having narrower leaves with elevated veinlets on the upper surface.

## Rhamneæ.

### *Rhamnus* LINN.

**Rhamnus** (*Eurhamnus-Cerrispina*) **oiwakensis** HAYATA sp. nov. Frutex 1–2 m. alt. ramosissimus, ramis teretibus fusco-purpurascens nitidis levibus haud lenticellatis, ramulis setiformibus alternatim vel decussatim dispositis  $\frac{1}{2}$ –2 cm. longis teretibus, ramulis foliiferis brevissimis 3 mm. longis apice subverticillatim approximativ foliatis basi perulis dense obtectis, perulis coriaceis castaneo-coloratis 1 mm. longis ciliatis obtusis vel acutis convexis. Folia approximata obovato-spathulata vel obovata  $1-1\frac{1}{2}$  cm. longa 6 mm. lata apice obtusissima vel rotundata basi cuneato-attenuata margine deorsum integra sursum crenata ad sinus crenarum setulis digiti-formibus rubescentibus  $\frac{1}{5}$  mm.



longis instructa, supra ad costas tenuiter hirsuta subtus glaberrima, supra venis costis planis haud distinctis, subtus costis venis venulis reticulatis distincte elevatis, petiolis 2 mm. longis minute hirsutis supra sulcatis, stipulis subulato-linearibus  $1\frac{1}{2}$  mm. longis hirsutis basi setulis digiti-formibus obtusis 4–5 brevissimis instructis. Flores ♂ axillares solitarii, pedicellis 4 mm. longis minute hirsutis apice ad calycem abeuntibus. Calyx late campanulatus pallido-viridis glaber, tubo tetragono-obpyramidali 8-costato 1 mm. longo  $1\frac{1}{2}$  mm. lato intus extusque glabro, limbo 4-partito, partibus oblongo-triangularibus  $2\frac{2}{3}$  mm. longis  $1\frac{1}{2}$  mm. latis plus minus crassiusculis glabris 1-nerviis apice acuminatis ad summum obtusis marginatis valvatis patentissimis. Petala 4 minute spathulata 1 mm. longa apice obtusa basi cuneato-attenuata glabra tenuissima concava stamina involventia ad marginem tubi calycis affixa glabra erecta. Stamina 4 ad marginem tubi calycis affixa petalis opposita, filamentis erectis validiusculis 1 mm. longis glabris, antheris ovatis  $\frac{1}{2}$ – $\frac{1}{3}$  mm. longis apice obtusis basi lobatis dorsifixis. Rudimentum ovarii minutum globosum, stylo columnari  $\frac{1}{4}$  mm. longo apice 2-partito. Fl. ♀ ignoti.

HAB. Oiwake, 7500 ped. alt., leg. B. HAYATA, Aprili. 1916.

Remarkable for the very small congested leaves.

## Sabiaceæ.

### *Meliosma* BLUME.

***Meliosma callicarpæfolia*** HAYATA (Pl. II.); Ic. Pl. Formos. III. p.

68. Descriptio aucta: Flores apertientes: bractea singula ovata  $\frac{2}{3}$  mm. longa  $\frac{1}{2}$  mm. lata apice obtusissima crassiuscula margine ciliolata; bracteola minuta 2. Sepala 3–4 late rotundata vel semi-rotundata  $1\frac{1}{4}$  mm. lata  $\frac{3}{4}$  mm. longa apice rotundata basi truncato-contracta integra concava glaberrima ad insertionem  $\frac{1}{3}$  mm. lata margine haud vel vix ciliolata. Petala 3 late rotundata plus minus inaequalia majora circ. 2 mm. lata  $1\frac{1}{2}$  mm. longa apice rotundata basi contracta ad insertionem  $\frac{1}{4}$  mm. lata apice crassiuscula margine integra imbricata. Stamina perfecta 2 cum petalis alterna, filamentis glabris linearibus basi dorso appendicibus obsagittiformibus instructis, apice connectivis semi-rotundatis peltatis  $\frac{1}{2}$  mm. latis  $\frac{1}{3}$  mm. longis terminatis, loculis antherarum 2 supra connectivum sitis introrsis globosis se contactis  $\frac{1}{4}$  mm. in diametro flavis. Staminodia

3 cum petalis affixa dorso complanata quadrangularia 1 mm. longa  $\frac{2}{3}$  mm. lata apice utroque latere auriculato-dilatata foveolataque. Glanduke disci 2-3 membranacee triangulares  $\frac{1}{2}$  mm. latae apice bicuspidatae vel simpliciter cuspidatae glabrae. Ovarium late rotundatum  $\frac{2}{3}$  mm. longum  $\frac{3}{4}$  mm. latum 2-loculare glabrum, stylo brevi columnari  $\frac{1}{2}$  mm. longo apice subulato-acuto.

HAB. Arisan, 8000 ped. alt., leg. U. FAURIE, Junio 1914, (No. 270).

## Rosaceæ.

### *Rubus* LINN.

**Rubus rarissimus** HAYATA sp. nov. Suffrutex, rami amotini fusco-rubescences teretes tenuiter pubescentes minutissime striati remote aculeati, aculeis latere complanatis  $2\frac{1}{2}$  mm. longis basi dilatatis apice deorsum plus minus recurvis, ramulis hornotinis fulvescentibus teretibus pubescentibus aculeatis 1-2-foliatis basi perulis multi-seriatis extus villosis instructis. Folia alterna trifoliata, folio terminali maximo subrhomboideo 8 cm. longo 6 cm. lato apice cuspidato basi triangulari-obtuso margine duplicato-dentato, (dentibus triangularibus apice breve aristatis, aristis sursum recurvis), supra subglabro vel tenuissime pubescenti subtus densissime brevissime villosa-tomentoso, tomentis pallido-fulvescentibus, costis et venis supra compressis subtus distincte elevatis, venis lateralibus primariis utroque latere 7-8 rectis mediis a costa angulo  $30^\circ$  egressis ad apicem dentium attingentibus, venulis rectis ad apicem dentium attingentibus vel reticulatis supra impressis subtus elevatis; foliolis lateralibus minoribus 6 cm. longis  $3\frac{1}{2}$  cm. latis apice acuminatis basi oblique obtusis latere inferiore latoribus quam latere superiore, brevissime petiolulatis, petiolulis 1-2 mm. longis; petiolis communibus 6 cm. longis pubescentibus aculeatis, rhachibus  $2\frac{1}{2}$  cm. longis, stipulis linearibus 8 mm. longis  $\frac{2}{3}$  mm. latis acuminatis. Flores cymosi. Cynae terminales vel axillares pedunculatae vel sessiles cum pedunculis  $2\frac{1}{2}$  cm. longae villosae 3-20-floratae, pedicellis ultimis 1 cm. longis. Calyx utraque villosus, cupula 3 mm. in diametro extus villosa intus glabra extus impressa intus elevata, lobis patentibus lineari-triangularibus 4-5 mm. longis 2 mm. latis villosis ad summum glabris. Petala 5 obovato-spathulata cum unguibus 4 mm. longa 3 mm. lata apice rotundato-truncata basi subito unguiculata, unguibus 1 mm. longis  $\frac{3}{4}$  mm. latis, margine subintegra vel erosa intus glabra sed basi hirsuta

extus versus costam hirsuta. Stamina  $\infty$  ad marginem cupulae inserta, filamentis filiformibus glabris 2 mm. longis, antheris ovato-oblongis  $\frac{1}{2}$  mm. longis glabris. Receptaculum carpellorum elevatum globosum breve stipitatum villosum, carpellis  $\infty$  semi-obovoides basi brevissime stipitatis, (stipitibus pilosis) basi apiceque pilosis medio latereque glabris, stylis terminalibus 2 mm. longis rubescentibus basi pilosis sursum glabris apice oblique truncatis 2-lobatis stigmatiferis.

HAB. Arisan, ad 2500 ped. alt., leg. U. FAURIE, Junio 1914, (No. 33).

Near *Rubus idaeus* LINN. subsp. *nipponica* FOCKE, but differs from it in having more numerous and less pilose carpels.

### *Cotoneaster* MEDIK.

***Cotoneaster morrisonensis*** HAYATA Ic. Pl. Formos. V. p. 62. Flores axillares vel ad apicem ramulorum terminales solitarii, pedicellis 3-4 mm. longis strigoso-hirsutis, pilis adpressis fulvescentibus rectis. Calyx obconicus 2-3 mm. longus totiusque latus extus adpresse hirsutus apice 5-lobatus, lobis triangularibus crassiusculis extus hirsutis intus glabris apice obtuso-truncatis 1 mm. longis  $1\frac{1}{2}$  mm. latis. Petala 5 ad basin lobi calycis affixa rotundata 3 mm. longa totiusque lata apice plus minus emarginata vel rotundata basi breve unguiculata contracta ad insertionem  $\frac{2}{3}$  mm. lata margine subintegra vel tenuiter erosa intus valde concava. Stamina  $\infty$  ad basin lobi calycis affixa, filamentis  $1\frac{1}{2}$  mm. longis basi incrassatis apice subulatis glabris, antheris rotundato-ovatis  $\frac{1}{2}$  mm. longis totiusque latis apice minus basi plus emarginatis; carpellis 2 a se distinctis dorso usque ad medium cum calycis tubo connatis sursum liberis, dorso dense albo-hirsutis, stylis columnaribus  $1\frac{1}{2}$  mm. longis glabris.

HAB. Taihasenzan, leg. TAYEMON ITÔ, ad 10000 ped. alt., Aprili. 1915.

### *Photinia* LINDL.

***Photinia lasiopetala*** HAYATA sp. nov. (Fig. 1.) Frutex, ramis et ramulis fusco-cinerascentibus longitudinaliter strigosis, lenticellis obscuris, haud hirsutis, ramulis annotinis glabris rubescentibus laevibus foliatis. Folia in vivo supra atroviridia et nitida in exsiccato pallido-rubra obovato-elliptica vel lanceolata obovata 10-15 cm. longa  $2\frac{1}{2}$ - $4\frac{1}{2}$  cm. lata apice breve acuminata versus basium gradatim attenuata ad basin subito acuta margine minute serrulata margine versus basin integra coriacea utraque glabra, costa supra impressa subtus elevata, venis venulis supra minus subtus plus elevatis gracillimis, venis

lateralibus primariis utroque latere circ. 15 tenuissimis a costa angulo  $30^\circ$  egressis prope marginem evanescentibus, petiolis 1–2 cm. longis glabris basi subito dilatatis caulem partim amplexantibus supra sulcatis; stipulis nullis. Panicula terminalis 8 cm.

longa pyramidalis, ramis divaricatis glabris vel tenuiter hirsutis, pedicellis  $1\frac{1}{3}$  cm. longis hirsutis. Calyx pallido-viridis obconicus 2 mm. longus totiusque latus hirsutus 5-dentato-lobatus, lobis vel dentibus erectis triangularibus 1 mm. latis  $\frac{2}{3}$  mm. longis apice acutis basi haud contractis crassiusculis, tubo intus glabro. Petala alba in ambitu obovata basi unguiculata, lamina subrotundata  $2\frac{1}{2}$  mm. longa totiusque lata apice obtuse bilobata extus glabra intus basi longe albo-hirsuta, pilis crispatis, unguibus 1 mm. longis intus densissime hirsutis extus glabris exterioribus recurvis. Stamina circ. 20 ad apicem tubi 1-seriatim

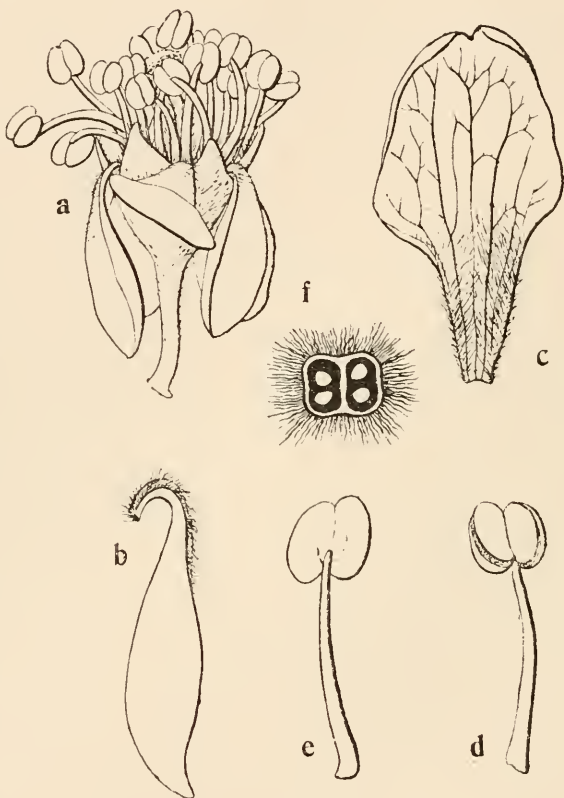


Fig. 1, *Photinia lasiopetria* HAYATA; a, a flower; b, a petal, seen from side; c, the same, seen from above; d, e, stamens, seen from different sides; f, cross section of ovary.

disposita, filamentis glabris filiformibus  $2\frac{1}{2}$ –3 mm. longis, antheris reniformibus basi 2-lobatis apice emarginatis  $\frac{2}{3}$  mm. longis totiusque latis flavis. Ovarium ovoideum usque ad medium cum tubo calycis connatum, partibus apicalibus liberis dense albo-hirsutis obconicis 1 mm. longis apice ad stylum abeuntibus; styli 2 basi connati dense hirsuti apice peltatim truncati stigmatosi; ovarium 2-loculare, loculis 2-ovulatis.

HAB. Musha : Baikēi, ad 2500 ped. alt., Aprili. 1916, leg. B. HAYATA.

Near *P. serrulata* LINDL., but easily distinguishable from it in having hirsute unguiculate petals. The habit of this new shrub is nearly the same as that of *Deutzia scabra*.

## Saxifrageæ.

### *Itea* LINN.

***Itea arisanensis*** HAYATA sp. nov. Frutex, ramulis gracilibus, cortice longitudinaliter ruguloso glabro. Folia remote disposita oblonga vel oblongo-lanceolata 10–14 cm. longa 3–5 cm. lata apice acuminata deorsum recurva basi obtusa vel acuta margine tenuiter et remotissime serrulata, (serrulis minutis a se 4–5 mm. remotis ascendentibus apice interiore recurvis), chartacea utraque pagine glaberrima, costis et venis supra tenuiter impressis subtus elevatis, venis primariis lateralibus gracillimis utroque latere costae 5–8 arcuatis sursum margine subparallelis gradatim evanescentibus, venulis gracillimis costa transverse dispositis transverse reticulatis supra haud visis subtus distincte visis, petiolis 1–1½ cm. longis supra sulcatis glabris. Flores ignoti. Racemi fructiferi terminales vel axillares 8–10 cm. longi 1½–2 cm. lati, pedunculis 1–2 cm. longis cum rhachibus pubescentibus, fructibus geminatim vel solitariter secus rhachin racemi dispositis transverse patentibus vel descendentibus, pedicellis 5 mm. longis apice leviter dilatatis ad tubum calycis abeuntibus, bracteis sub pedicello linearibus vel lanceolatis 1½ mm. longis. Calycis fructiferi tubus infundibulicampanulatus 1 mm. longus 1½ mm. latus, limbo 2½ mm. in diametro margine lobato, lobis 5 triangulari-enspidatis 1 mm. longis totiusque latis apice acutis, sinibus inter lobos late rotundatis. Carpella 2 supra tubum calycis fere distincta erecta leviter divaricata fusiformi-linearia supra cupulam ad 5 mm. exserta 1 mm. lata sparse minute hirsuta apice attenuata dorso in sectione convexa facie plana in sectione semi-rotundata sutura ventrali dehiscencia. Semina minuta numerosa ovoideo-fusiformia 1¾ mm. longa ¼ mm. lata alteri extremitate attenuata acuta alteri extremitate obtusa, testa sicca rugosissima fusco-rubescente nitida.

HAB. Mt. Arisan : inter Suisharyō et Funkiko, leg. B. HAYATA, Aprili. 1914. (Fructus).



Near *Itea chinensis*, but distinguishable from it in having less serrate leaves of much thinner texture.

## Crassulaceæ.

### *Sedum* LINN.

***Sedum uraiense*** HAYATA sp. nov. Herba tenuissima basi repens, partibus erectis 10 cm. longis crispato-hirsutis, pilis transverse patentibus. Folia in exsiccatu tenuissime membranacea in vivo crassiuscula opposita vel rarius ternata a se 2-3 cm. remota petiolata, lamina ovata vel rotundato-ovata circ.  $1\frac{1}{2}$ -2 cm. longa 13-15 mm. lata apice obtusissima basi subito attenuata ad petiolum abeuntia margine integra densiuscule patento-ciliolata supra sparsissime hirsuta subtus subglabra, petiolis 5-8 mm. longis. Cymæ terminales laxissime floratæ cum pedunculis 7 cm. longis brevissime patento-hirsutæ, pedicellis terminalibus 2-5 mm. longis. Sepala 5 extus oblongo-triangularia  $1\frac{1}{2}$  mm. longa  $\frac{2}{3}$  mm. lata apice obtusa basi haud contracta margine integra extus dense hirsuta intus glabra tenuiter 1-nervia. Petala 5 lanceolata 3-3 $\frac{1}{2}$  mm. longa  $\frac{3}{4}$  mm-1 mm. lata apice acuminatissima basi leviter angustata ad insertionem  $\frac{1}{2}$  mm. lata integra tenuiter 1-nervia. Stamina 10, filamentis filiformibus 2 mm. longis glabris, antheris globosis  $\frac{1}{4}$  mm. in diametro 2-locularibus; glandulis 5 carpello oppositis rectangularibus  $\frac{1}{2}$  mm. longis. Carpella 5 lanceolata glanduloso-hirsuta apice ad stylum attenuata; carpella matura membranacea hyalina oblonga 2 mm. longa  $\frac{2}{3}$  mm. lata apice ad stylum abeuntia. Semina ovoideo-ellipsoidea utraque truncata circ.  $\frac{1}{2}$  mm. longa profunde 8-13-sulcata minute eleganter transverse multo-striata in sectione teres, testa crustacea fusco-castanea. Embryo ignotus.

*Sedum drymarioides* HAYATA Ic. Pl. Formos. IV. p. 110, (non HANCE).

HAB. Urai, in petrosis rara, leg. U. FAURIE, Aprili. 1914, (No. 810).

Near *S. drymarioides* HANCE, but differs from it in having much longer petals.

## Hamamelideæ.

### *Corylopsis* SIEB. et ZUCC.

***Corylopsis stenopetala*** HAYATA (Pl. III.) Ic. Pl. Formos. IV. p. 6.

Descriptio aucta: Spicæ fructiferæ erectæ 3-4 cm. longæ cum fructibus



2-3 cm. latæ, pedunculis 4-5 cm. longis glabris; rhachis spicæ post anthesin accrescens hirsuta dense fructifera; calycis tubus in fructu accrescens plus minus stipitatus cum stipite incrassato 1 cm. longus 8 mm. latus, lobis minutis dentiformibus; carpella 2 calycis tubo insita medio supra exserta oblonga apice bicornuta, cornibus exteriore recurvis, 2-valvatum dehiscencia, exocarpio crustaceo fuscenti, endocarpio crustaceo-osseo albo-fulvescenti, 1-sperma; semina ellipsoidea 7-8 mm. longa, testa crustacea nigra nitida.

HAB. Nantō: Jinrinsha, leg. U. MORI, Juli. 1907, (No. 292).

## Halorageæ.

### *Callitriche* LINN.

***Callitriche japonica*** ENGELM.; FRANCH. et SAVAT. Enum. Pl. Jap. II. p. 369; ITO et MATSUM. Tent. Fl. Luteh. p. 205; MATSUM. Ind. Pl. Jap. II.-2 p. 310.

HAB. Taihoku: Koteishō, leg. Y. SHIMADA, Mart. 1915. (Fl. et fr.).

DISTRIB. Japan.

Compared with a Japanese specimen in the Herbarium at Tōkyō.

## Begoniaceæ.

### *Begonia* LINN.

***Begonia aptera*** HAYATA Mater. Fl. Formos. p. 122. Descriptio aucta: Cynæ terminales cum pedunculis circ. 10 cm. longæ 15 cm. latæ, (pedunculis 5 cm. longis), toto glabræ; pedicellis ultimis 5-13 mm. longis gracillimis. Flores ♂: glabri albicantes; segmenta 4, exteriora 2 interiora 2; exteriora late cordato-rotundata  $1\frac{1}{2}$  cm. longa totiusque lata apice obtuse rotundata basi subeordata margine integra; segmenta interiora obovato-spathulata 9 mm. longa 4 mm. lata apice obtusissima basi cuneata subunguiculata margine integra. Semina numerosa, antheris obovatis  $1\frac{1}{4}$  mm. longis 1 mm. latis apice emarginatis basi obtuso-cuneatis. Fl. ♀: segmenta ignota; ovarium late depresso-globosum 7 mm. longum 10 mm. latum ex-alatum glabrum; styli 3, 4 mm. longi erecti apice 2-fidi, ramis erectis 3 mm. longis tortuosis.

HAB. Suisha, leg. B. HAYATA et S. SASAKI, Mai. 1912; Maisha, leg. B. HAYATA et S. SASAKI, Jun. 1912.

**Begonia ferruginea** HAYATA Mater. Fl. Formos. p. 123. Descriptio aucta: Segmenta 5; exteriora 2 majora, interiora 2 minora; exteriora late oblonga 10 mm. longa 7 mm. lata plus minus obliqua apice rotundata margine subintegra extus hirsuta intus glabra; segmenta interiora minora; intimum minimum glabrum oblongum 7 mm. longum  $3\frac{1}{2}$  mm. latum apice obtusum. Styli 2-3 mm. alti semi-infundibuli-forme dilatati 2-fidi; ramis 2 mm. longis erectis tortuosis vermiformibus. Ovarium hirsutum oblongo-obovatum 6-7 mm. longum 4 mm. latum obliquum 3-alatum; ala posteriore elongata transverse sita lineari circ. 10 mm. longa 4 mm. lata apice obtusissima hirsuta; alis lateralibus verticaliter sitis linearibus 8 mm. longis sursum latioribus 1-2 mm. latis deorsum angustioribus ad nullum reductis hirsutis. Capsula ab apice pedicellorum subito deorsum reflexorum pendula 2-ocularis tenuiter ferrugineo-tomentosa demum subglabrata (alis exceptis) lineari-obovata 15 mm. longa 5 mm. lata apice subtruncata basi attenuata ad pedicellum abeuns; ala posteriore quadranguliformi  $2\frac{1}{2}$  cm. longa  $1\frac{1}{2}$  cm. lata apice obtusissima tenuiter tomentosa nervosa transverse descendenteque sita; alis lateralibus linearibus verticaliter sitis  $1\frac{1}{2}$  cm. longis 4 mm. latis nervosis tenuiter tomentosis. Semina numerosissima minutissima polygono-ellipsoidea reticulata rubro-fulvescentia  $\frac{1}{4}$  mm. longa.

HAB. Arisan, leg. B. HAYATA, Jan. 1912, (typus fructus).

The present species is contrasted from *B. laciniata* ROXB. var. *formosana* HAYATA in having hairy ovary and hairy outer segments which are obliquely oblong and quite rounded at the apex, and in having quite erect branches of the styles.

**Begonia laciniata** ROXB. var. **formosana** HAYATA Mater. Fl. Formos. p. 124. Descriptio aucta: Fl. ♀: segmenta 5, exteriora 2; interiora 3; segmentum exterius rotundatum 8 mm. longum 7 mm. latum apice triangulari-obtusum basi rotundatum ad insertionem 3 mm. latum margine subintegrum; interiora minora inequalia. Styli 2, breviores 1 mm. alti 2-fidi, ramis vermiforme recurvis. Ovarium oblique triquetrum 5 mm. longum ad angulum alatum, alis inequalibus; ala posteriore quadranguliformi 4 mm. longa 3 mm. lata ovario transversum sita, alis lateralibus angustissime linearibus 3 mm. longis 1 mm. latis. Flores cum ovario alisque toto glabri.

HAB. Mai, Juli. 1912, leg. B. HAYATA.

## Araliaceæ.

*Heptapleurum* GAERTN.

**Heptapleurum arboricolum** HAYATA sp. nov. (Pl. IV.) *Schefflera arboricola* HAYATA. Frutex circ. 3-4 m. altus ramosus, ramulis crassiusculis sursum 7-8 mm. in diametro densiuscule lenticellatis, lenticellis oblongis 2-3 mm. longis sursum foliatis. Folia alterna longe petiolata palmatim 7-8-foliolata, foliolis centralibus majoribus, basilaribus minoribus, totis petiolulatis; foliolum centrale obovato-oblongum 9 cm. longum 4 cm. latum apice obtusissimum ad centrum summi emarginatum deorsum angustius ad extremitatem obtusum margine integerrimum, costa supra minus subtus plus elevata, venis venulis supra plus subtus minus elevatis, utraque pagine glaberrimum, supra nitidum subtus glaucum pallidum, venis lateralibus primariis utroque costæ latere 5-6, mediis a costa angulo  $45^{\circ}$  egressis subrectis sursum arcuatis apice ramosis, venulis elevato-reticulatis, petiolulis  $3\frac{1}{2}$ - $2\frac{1}{2}$  cm. longis semi-teretibus sursum sulcatis subulatis basi cum apice petioli articulatis glabris; petiolis communibus 12-15 cm. longis teretibus glabris subrectis apice subito sursum recurvis basi valde dilatatis, partibus dilatatis auriculi-formibus, auriculis 5 mm. longis et latis semirotundatis coriaceis. Racemi terminales vel ad axillas foliorum apicalium siti simplices vel paniculato-umbellatim dispositi; racemis vel ramis panicularum subæquilongis 20 cm. longis in ambitu cylindricis remote ramulosis, ramulis æquilongis 1 cm. longis divaricatis apice flores umbellatim circ. 10 gerentibus subglabris vel hirsutis, bracteis caducis ignotis, pedicellis florum 5-7 mm. longis radiatim divaricatis rectis glabris vel sparse hirsutis apice plus minus dilatatis ad calycem abeuntibus. Calyx depresso-campanulatus  $1\frac{1}{2}$  mm. longus 2 mm. in diametro margine integer vel obscure dentatus, dentibus minutis haud distinctis. Petala 5-7 lineari-triangularia  $2\frac{1}{2}$  mm. longa 1- $1\frac{1}{2}$  mm. lata apice acuta ad summum interdum intus cornibus instructa basi plus minus contacta 3-nervia glabra. Stamina 5-7, ad marginem disci inserta, filamentis glabris filiformibus complanatis  $2\frac{1}{2}$  mm. longis, antheris late rotundatis 1 mm. longis totiusque latis apice basique 2-lobatis. Discus pulvini-formis. Stylus subnullus, stigmate depresso-rotundato  $1\frac{1}{2}$  mm. in diametro  $\frac{1}{4}$  mm. alto. Ovarium 5-7-loculare, loculis 1-ovulatis. Fructus obovoideo-globosus 5 mm. longus 4 mm. latus distincte 5-6-sulcatus.

HAB. Tōyenchō : Kappansan, ad truncos *Fici insularis* cresecus, leg. S. SASAKI, Nov. 1915.

Near *Heptapleurum octophyllum* HANCE; but distinguishable from it by the much smaller, thicker, coriaceous leaves and in the very depressed rounded stigmata. *H. octophyllum* is terrestrial, but this new species is always found to be epiphytic.

## Caprifoliaceæ.

### *Lonicera* LINN.

***Lonicera oiwakensis*** HAYATA sp. nov. (Pl. V.) Frutex 1–2 m. altus, ramis rectis striatis teretibus, cortice cinerascenti minute muricato haud hirsuto longitudinaliter fissio et soluto, ramulis divaricatis strigoso-pilosis rectis foliiferis teretibus. Folia opposita elliptica rigide coriacea  $2\frac{1}{2}$  cm. longa  $1\frac{1}{2}$  cm. lata apice emarginata vel rotundata basi rotundata vel truncata margine integra setulosa, costa supra impressa subtus elevata, venis supra impressis subtus elevatis, venulis reticulatis supra tenuiter impressis subtus elevatis, pagina supra scaberrima ad centrum reticulorum setula instructa, subtus ad venas venulas strigoso-hirsuta, in exsiccato supra fuscentia subtus fulvo-flavescentia, venis lateralibus primariis utroque costae 4 arcuatis, petiolis 2–3 mm. longis hirsutis supra sulcatis basi triangulari-dilatatis ad pulvinum abeuntibus, pulvinis foliorum cum iis oppositis fere amplexicaulibus. Flores subpenduli subalbi apice plus minus rosei a basi ramuli hornotini brevis 1–2 cm. longi oriundi, pedunculis gracilibus nutantibus 1 cm. longis vel interdum ad nullum reductis valde complanatis strigoso-scabris apice 2-bracteatis flores geminatim gerentibus, bracteis oppositis linearibus falcatum recurvis 8 mm. longis 1 mm. latis acuminatis margine integris setulosis supra tenuiter hirsutis subtus costatis, ad costas setuloso-hirsutis. Calyx viridis cum eo opposito latere interiore toto comatus, tubo obconico-cylindrico glabro 2 mm. longo 1 mm. lato apice truncato basi emeato, limbo cupuli-formi campanulato extus intusque glabro 1 mm. alto 2 mm. in diametro margine tenuiter et irregulariter 5-lobato, lobis apice rotundatis margine ciliolatis. Corolla alba apice rosea tubuloso-infundibuliformis, tubo 7 mm. longo 2 mm. lato basi obliquo valde oblique contracto latere anteriore prope basin gibboso extus setuloso-hirsuto intus strigoso-hirsuto, limbo

2-labiato, labio superiore latiore 7 mm. longo totiusque lato utraque glabro retrorse reflexo apice 4-lobato, lobis oblongis apice rotundatis apice concavis integris; labio inferiore lineari-oblongo 8 mm. longo 4 mm. lato apice obtusissimo margine integro. Stamina 5 infra apicem tubi affixa exserta, filamentis circ. 6 mm. longis subglabris teretibus, antheris oblongo-linearibus  $2\frac{1}{2}$  mm. longis albis. Stylus albus columnari-filiformis 1 cm. longus glaber apice plus minus latior, stigmate viridi subterminali peltato oblongo 1 mm. longo sub-oblique peltatum ad apicem styli sito; ovarium inferum 3-loculare, loculis 4-5-ovulatis.

HAB. Musha: Oiwake, ad 8750 ped. alt., leg. B. HAYATA, Aprili. 1916.

Near *L. Morrowii*; but differs from it in the pubescence of the leaves. Hairs on the leaves of this new species are much stouter having a conical dilated base, while those of *L. Morrowii* are much more slender without any conical base.

***Lonicera transarisanensis* HAYATA** (Fig. 2) n. n. *Lonicera angustifolia* HAYATA (non RAFFIN) Ic. Pl. Formos. II. p. 75. Descriptio aucta: Corolla

glabra tubuloso-campanulata, tubo 12 mm. longo basi 1 mm. lato apice 3 mm. lato extus glabro intus densissime hirsuto, limbo expanso-campanulato 2-labiato, labio inferiore lineari 11 mm. longo 3 mm. lato apice obtusissimo basi hand contracto 7-8-nervio (nervis subparallelis) subtus glabro supra versus basin piloso, labio superiore deorsum recurvato margine latere integro rotundato 9 mm. longo totiusque lato apice in ambitu truncato vel emarginato erecto-patenti margine latere exteriori plicato-recurvo apice 4-lobato, lobis 2-lateralibus majoribus late triangularibus 3 mm. longis 4 mm. latis apice obtusissimis concavis margine exteriori integris interiori denticulatis basi latere interiore auriculis singulis triangularibus deorsum recurvis instructis, lobis 2-mediis minoribus rotundato-triangularibus  $2\frac{1}{2}$  mm. latis apice obtusissi-



Fig. 2, *Lonicera transarisanensis* HAYATA; a, a pair of flowers; b, a flower; c, corolla expanded; d, ovaries; e, cross section of an ovary; a, b, c, d, nearly natural size.



mis basi haud contractis margine integris; labio superiore extus glabro intus basi plus minus hirsuto. Stamina 5 ab apice tubi corollæ oriunda, filamentis triquetris circ. 8 mm. longis deorsum hirsutis sursum glabris 1-nerviis, antheris linearibus 5 mm. longis 1 mm. latis apice obtusis basi bilobatis, lobis 1 mm. longis, versatilibus. Stylus filiformis 2 cm. longus exsertus dense pilosus (basi apice excepto) sursum glaber, stigmatе globoso 2 mm. lato leviter 3-lobato.

HAB. Arisan, ad 2500 m. alt., leg. U. FAURIE, Junio 1914, (No. 359).

Near *L. Henryi* HEMSL., but differs from it in having quite glabrous peduncles, and in the costas of the leaves which are, in this new species, brownish hairy.

## Compositæ.

### *Chrysanthemum* LESS.

**Chrysanthemum arisanense** HAYATA sp. nov. (Pl. VI.) Herba basi suffrutescens 40 cm. longa molle lanuginoso-hirsuta. Caulis simplex haud ramosus teres 2 mm. in diametro sectionis erectus. Folia radicalia ignota; caulina petiolata pinnatisecta in ambitu ovata 5 cm. longa 3 cm. lata apice acuminata basi truncata vel truncato-cordata, segmentis circ. 5; segmento terminali ovato-lanceolato 3 cm. longo 13 mm. lato apice acuminato basi ad rhachin attenuato laciniato-pinnatilobato, lobis linearibus vel serri-formibus ascendentibus apice cuspidatis acutis superiore leviter recurvis, segmentis lateralibus ovato-lanceolatis vel oblanceolatis oppositis laciniato-pinnatilobatis, apice acutis basi attenuatis; rhachis 2-1 mm. lata; pagina supra brevissime parce sed ad nervos venasque dense crispato-hirsuta subtus dense adpresso-hirsuta, pilis subalbicantibus; petiolis 2 cm. longis dense hirsutis dorso complanatis; folia superiora minora. Capitula 3-4 ad apicem caulis sub-umbellatim disposita, (pedunculis 2½ cm. longis adpresse hirsutis) rotundato-campanulata 8 mm. longa 10 mm. lata. Involuerum rotundato-obconicum 7 mm. longum, bracteis 3-seriatim dispositis, extimis brevissimis oblongo-ovatis 4 mm. longis 2 mm. latis dorso carinatis (ad carinam hirsutis) scariosis apice acutis basi haud contractis intus glabris, mediis longissimis oblongis 6½ mm. longis 3 mm. latis apice obtusis basi ad insertionem 1 mm. latis dorso 1-carinatis intus concavis scariosis utraque glabris, intimis oblanceolatis 6 mm. longis 2 mm. latis apice obtusis basi attenuatis



ad insertionem  $\frac{2}{3}$  mm. latis dorso tenuiter carinatis scariosis utraque glabris. Flores marginales 1-seriatim? dispositi liguliformes foeminei. Corolla linguiformis, tubo subnullo vel  $\frac{1}{2}$  mm. longo, lamina linear-oblonga 6 mm. longa  $1\frac{1}{2}$  mm. lata apice obtusa basi breve attenuata. Styli  $2\frac{1}{2}$  mm. longi apice 2-fidi, ramis dorso complanatis linearibus circ. 1 mm. longis  $\frac{3}{5}$  mm. latis utroque latere stigmatiferis apice truncatis breve pectinatis. Flores disci tubiformes hermaphroditi glandulis globosis minutis parce conspersi, tubo  $1\frac{1}{2}$  mm. longo  $\frac{1}{3}$ – $\frac{1}{2}$  mm. lato cylindrico, limbo campanulato-tubuloso  $1\frac{1}{3}$ – $1\frac{1}{2}$  mm. longo 1 mm. lato apice 5-lobato, lobis triangularibus  $\frac{1}{2}$  mm. longis totiusque latis apice acutis. Stamina 5 basi limbi oriunda, filamentis filiformibus glabris, antheris linearibus cum appendicibus connectivorum  $1\frac{1}{3}$  mm. longis  $\frac{3}{5}$ – $\frac{4}{5}$  mm. latis apice appendiculatis, appendiculis linearibus apice acuto-obtusis  $\frac{1}{3}$  mm. longis  $\frac{2}{5}$ – $\frac{3}{5}$  mm. latis, basi brevissime auriculatis. Styli ut floris feminei. Achæmium ellipsoideum utrinque obtusissimum plus minus obliquum  $1\frac{3}{4}$  mm. longum 1 mm. latum fusco-purpurascens.

HAB. Arisan, in rupibus rara, leg. U. FAURIE, Dec. 1914, No. 1427.

Near *Chrysanthemum indicum*, but differs from it in having more deeply lacinate leaves.

### *Gerbera* GRON.

***Gerbera integripetala*** HAYATA sp. nov. Folia radicalia circum basin scapi 5–6 disposita in ambitu oblonga 3 cm. longa 18 mm. lata margine inferiore utroque latere profunde sinuata (sinibus circ. 1 cm. longis 3 mm. latis, margine leviter dentatis, dentibus brevissimis interdum ad aristam reductis apice breve aristatis, aristis a se 4 mm. remotis), membranacea supra glabra subtus molle albo-tomentosa apice acuta basi obtusa, petiolis 4 cm. longis albo-lanuginoso-tomentosis basi gradatim dilatatis. Scapus simplex 15 cm. longus erectus rectus albo-lanuginosus versus apicem 2–3-bracteatus, bracteis linearibus adpressis 6 mm. longis acuminate dorso costato-carinatis. Capitula simplicia erecta obconica 12 mm. longa; bracteis involucri 2-seriatim dispositis, exterioribus minoribus erecto-linearibus 4 mm. longis dorso costatis obtusis lanuginosis interioribus longioribus linearibus rectis 7 mm. longis apice truncatis 1 mm. latis. Flores ♀ ligulares marginales 1-seriatim dispositi extus purpurei intus albi, tubo corollæ 3 mm. longo, limbo liguliformi lineari 8 mm. longo apice

truncato vel rarius obscure dentato glabro; styli simplices; setæ pappi scabridæ; achenia linearia hirsuta. Fl. ♂: tubo corollæ 4 mm. longo glabro; limbo 5-partito, partibus 2 distinctis, 3 connatis linearibus obtusis glabris deorsum recurvis; antheræ lineares cum appendicibus et caudis  $2\frac{1}{2}$  mm. longæ apice appendiculatæ, appendicibus apicalibus lineari-oblongis  $\frac{1}{2}$  mm. longis obtusis, basi sagittatæ caudis simplicibus  $\frac{1}{3}$  mm. longis instructæ; filamentis complanatis glabris. Stylus columnaris 6 mm. longus glaber apice 2-lobatus, lobis complanatis subrotundatis stigmatosis, basi haud dilatatus; stylophorum nullum. Discus annuliformis  $\frac{1}{6}$  mm. altus. Achenium hirsutum maturum ignotum.

HAB. Gōkwanzan, leg. B. HAYATA, Aprili. 21, 1916.

Approaches to *G. Anandria*, but differs from it in having nearly entire corolla-lips of the marginal flowers, and in the pappus-hairs.

### *Lactuca* LINN.

***Lactuca vericolor*** SCH-BIP.; MATSUM. et HAYATA Enum. Pl. Formos. p. 212.

The Japanese plant has pale white or very slightly purpurascens flowers, while the Formosan has bright yellow ones. The two (Japanese and Formosan) are, therefore, not exactly identical. The Formosan should be regarded as a variety of the Japanese species.

## Ericaceæ.

### *Rhododendron* LINN.

***Rhododendron Morii*** HAYATA Mater. Fl. Formos. p. 173, et Ic. Pl. Formos. III. p. 139. Descriptio aucta: Flores ad apicem ramorum 5–10 quasi-umbellatim (cymose) congesti, umbellis basi perulis multis deciduis suffultis; perulis exterioribus obovatis circ. 2 cm. longis 1 cm. latis valde concavis coriaceis apice breve apiculatis brevissime hirsutis, interioribus gradatim elongatis circ. 3 cm. longis; bracteis basi pedicellorum sitis angustato-linearibus 3 cm. longis 7 mm. latis apice breve cuspidatis (cuspidibus 4 mm. longis) extus plus intus minus sericeo-hirsutis; bracteolis lineari-filiformibus 8 mm. longis hirsutis; pedicellis circ. 2 cm. longis brevissime hirsutis. Calycis lobi triangulares vel semi-rotundati 1 mm. longi  $1\frac{1}{2}$  mm. lati margine ciliolati vel haud ciliolati extus parce hirsuti intus glabri, ciliolis clavatis brevissimis. Corolla campanulata

plus minus obliqua rosea vel albescens intus latere superiore rubro-punctata, tubo obconico 2 cm. longo, lobis 5 reniformibus 1-1½ cm. longis latoribus quam longis apice rotundatis basi plus minus cordatis. Stamina 9-12, filamentis inaequalibus basi dilatatis hirsutis, antheris lineari-ellipticis 3½-4 mm. longis 2-locularibus apice 2-porosis. Ovarium conicum ellipticum 5-6 mm. longum basi 3 mm. latum hirsutum. Styli 3 cm. longi haud exserti ~-formiter recurvi basi excepto glabri, stigmate brevissime 5-6-lobato; discus lobulatus obscurus.

HAB. Mt. Arisan, leg. B. HAYATA, Mart. 1914.

## Styraceæ.

### *Symplocos* LINN.

***Symplocos theifolia*** HAYATA n. n. *Symplocos adinandrifolia* HAYATA var. *theifolia* HAYATA Ic. Pl. Formos. V. p. 96.

HAB. KURAN, leg. H. INABA, Aug. 1911.

## Apocynaceæ.

### *Anodendron* A. DC.

***Anodendron suishaense*** HAYATA sp. nov. (Pl. VII.) Frutex scandento-volubilis. Rami et ramuli teretes fusco-purpurascetes sublaeves, ramulis gracilibus. Folia opposita coriacea lanceolata vel oblanceolata 8-11 cm. longa 1½-2½ cm. lata apice acuta vel breve acuminata basi cuneata vel cuneato-acuta margine integra glabra supra nitida atro-viridia subtus pallida, costa supra subplana subtus elevata, venis lateralibus primariis utroque latere 7-8 basi rectis a costa angulo 60° egressis sursum subito arcuatis cum iis superioribus conjunctis, petiolis 1-1½ cm. longis supra sulcatis glabris. Cymæ paniculatæ terminales cum pedunculis 7 cm. longæ glabræ, pedunculis 2 cm. longis, ternatim ramosæ, ramis rectis divaricatis ad ramificationem 1-bracteatis, bracteis oppositis triangularibus 2 mm. longis 1½ mm. latis cuspidato-acutis glabris dorso carinatis, pedicellis 2 mm. longis rectis glabris apice 2-bracteolatis, bracteolis oppositis ovatis 1½ mm. longis ¾ mm. latis apice acutis. Calyx glaber 5-partitus, sepalis ovato-triangularibus 2 mm. longis 1 mm. latis apice acutis basi haud vel vix contractis dorso plus minus crassiusculis margine plus minus

ciliolatis; squamæ inter sepala minutæ lepidiformes  $\frac{1}{3}$  mm. longæ crassiusculæ glabræ. Corolla flava hypocrateriformis, tubo 4 mm. longo extus glabro deorsum plus minus latiore  $1\frac{1}{4}$  mm. lato sursum angustiore  $\frac{2}{3}$  mm. lato intus dense hirsuto, lobis dextrorsum obtegentibus patentissimis tortuosis oblique cultriformi-linearibus 5–6 mm. longis  $1\frac{1}{3}$  mm. latis falcatin recurvis extus glabris, intus latere uno glabro latere uno hirsuto. Stamina 5, filamentis brevissimis totis basi tubo corollæ connatis apice subliberis intus plus minus hirsutis, antheris lineari-sagittiformibus  $1\frac{1}{2}$  mm. longis  $\frac{1}{3}$  mm. latis apice acuminatissimis basi sagittatis apice ad appendiculam membranaceam productis. Discus 5-dentatus circum ovarium situs, dentibus triangularibus obtusis  $\frac{1}{3}$  mm. longis. Ovarium 2-partitum, stigmate breve stipitato conico  $\frac{1}{2}$  mm. longo, stipite  $\frac{1}{4}$  mm. longo toto glabro; partitis ovarii depresso-globosis  $\frac{1}{2}$  mm. longis apice obtuso. truncatis.

HAB. Monte Suisha, leg. B. HAYATA, Mai. 1916.

Near *Anodendron levee*; but differs from it in the much smaller yellow flowers.

## Loganiaceæ.

### *Gardneria* WALL.

***Gardneria Shimadai*** HAYATA sp. nov. Frutex, ramis et ramulis teretibus sublaevibus fuscentibus, squamis triangularibus 2 mm. longis oppositis hæc atque illæ instructis. Folia opposita (jugis a se 3 cm. remotis) lanceolata chartacea  $8\frac{1}{2}$  cm.–11 cm. longa 27–33 mm. lata apice obtuso-acuminata vel triangulari-acuminata basi obtusa margine integerrima tenuiter deorsum revurva utraque glaberrima supra viridissima subtus pallidissima, costa supra tenuiter elevata vel impressa subtus tenuiter prominente, venis lateralibus primariis utroque latere costæ 9–10 rectis a costa angulo 20–30° egressis ad medium furcatim ramosis utraque pagine tenuiter elevatis, petiolis 7 mm. longis supra late sulcatis. Flores ignoti. Cymæ fructiferae circ. 3 cm. longæ glabræ pauciramosæ, fructus 1–2 gerentes. Bacca globosa in exsiccatu nigricans.

HAB. Tikushizan, leg. Y. SHIMADA, Mart. 1915, (fructus).

Near *Gardneria nutans* S. et Z., but differs from it in the much thicker leaves which are lanceolate and triangularly acuminate at the apex.

## Gentianaceæ.

*Swertia* LINN.

**Swertia shintenensis** HAYATA sp. nov. Herba annua 45 cm. alta crecta medio sursum ramosa. Folia radicalia ignota. Folia caulina opposita oblongo-ovata 6 cm. longa 3 cm. lata apice acuminata basi rotundato-cordata sessilia caulem semi-amplectantia margine integerrima crassiuscula glabra, venis primariis lateralibus paucis, venulis reticulatis; foliis ramorum floriferorum minutis lanceolatis 1 cm. longis 3 mm. latis apice acuminatis basi attenuatis ramos semi-amplectantibus oppositis glabris. Flores latissime cymosi, pedicellis 2-3 cm. longis. Calyx late campanulatus alte 4-lobatus, lobis semi-rotundato-triangularibus 4 mm. longis totiusque latis apice cuspidato-acutis vel acutis basi latissimis haud contractis obscure trinerviis glabris integris. Corolla campanulata altissime 4-fida, tubo 2 mm. longo, segmentis oblongis 17 mm. longis 9 mm. latis apice triangulari-acutis ad summum obtusis basi 3 mm. latis 5-nerviis vel obscure multi-nerviis, venulis reticulatis glabris intus medio 1-maculatis, maculis obtuse quadrangularibus  $4\frac{1}{2}$ -5 mm. longis 4 mm. latis. Stamina 5 e basi lorum corollæ oriunda, filamentis dorso complanatis glabris linearibus 5-6 mm. longis basi latissimis 2 mm. latis sursum gradatim angustatis apice subulato-linearibus distincte 1-nerviis, antheris ovato-linearibus  $4\frac{1}{2}$  mm. longis 2-2 $\frac{1}{2}$  mm. latis apice obtusis basi alte 2-lobatis, lobis 2 mm. longis. Ovarium cum stipite 7 mm. longum obovoideum plus minus complanatum  $4\frac{1}{2}$  mm. latum, stipite circ. 2 mm. longo 3 mm. lato, stylo validissimo 4 mm. longo columnari-coniformi basi 3 mm. lato sursum angustiore apice stigmate 2-partito coronato; segmentis stigmatis ovatis  $1\frac{1}{2}$  mm. longis 1 mm. latis lamelliformibus horizontaliter dispositis.

HAB. in monte Shinten, 2400 ped. alt., leg. U. FAURIE, Nov. 1914, (No. 1256).

Near *Swertia Kuroiwai* MAKINO.

## Boragineæ.

*Cordia* LINN.

**Cordia Kanehirai** HAYATA sp. nov. Frutex? Ramuli fulvo-cinerascentes



hirsuti. Folia chartacea lanceolato-ovata vel lanceolata 9–14 cm. longa  $2\frac{1}{2}$ –6 cm. lata apice acuminata versus summum lineari-acuminata basi acuta vel obtusa, costa supra minus subtus plus elevata, venis lateralibus primariis utroque latere costae 5–6 arcuatis utraque elevatis, venis secundariis et venulis obscuris, margine remote serrulata vel subintegra, serrulis a se 7 mm. remotis apice interiore recurvis, utraque pagine hirsuta in exsiccatum supra fusca subtus pallidiora, petiolis 7–20 mm. longis. Cymae terminales dense floratae dense brevissime hirsutae. Alabastrum floris: calyx-tubus cylindricus 4 mm. longus  $2\frac{1}{2}$  mm. latus 10-sulcatus extus fulvo-hirsutus; lobis 5 minutis setuliformibus interiore recurvis. Corolla staminaque ignota. Bacca? ellipsoidea 13 mm. longa 8 mm. lata 1-pyrena; pyrenis oblique ellipticis utrinque obtusis grosse obtuseque spinoso-tuberculatis, testis crustaceis; semina ignota.

HAB. Kōshūn: Kurara, leg. R. KANEHIRA, Jan. 1914, (No. 7).

Near *Cordia Cumingiana*.

### *Trigonotis* STEV.

***Trigonotis elevato-venosa*** HAYATA sp. nov. Herba humilis perennis cum pedunculis circ. 15 cm. longa erecta gracillima haud vel paucè ramosa in exsiccatum ferrugineo-hirsuta, stolonibus gracillimis 15–20 cm. longis. Folia radicalia longe petiolata perfecte elliptica 2– $2\frac{1}{2}$  cm. longa 10–13 mm. lata apice rotundata plus minus emarginata et ad centrum brevissime mucronata basi obtusa margine integra vel crispato-undulata supra viridia haud nitida subtus pallida, costa supra impressa subtus elevata, venis supra elevatis sed subtus impressis, utraque pagine adpresse pubescentia, venis lateralibus 4–5 rectis angulo  $45^\circ$  a costa egressis per venam marginalem conjunctis, venis marginalibus a margine 1–2 mm. distantibus, petiolis longissimis 3–4 cm. longis; foliis stolonis minoribus breve petiolatis rotundatis 8 mm. longis. Caulis apice 2-ramosus vel simplex apice ad racemos abeuns. Racemi graciles 8 cm. longi recti simplices vel rarius a basi furcatim mi-plo ramosi hirsuti, ramis simplicibus rectis erectis secunde floriferis, pedicellis hirsutis 2 mm. longis haud bracteatis. Calyx viridis 5-partitus, segmentis obovato-spathulatis apice obtusis extus strigoso-hirsutis intus minute hirsutis  $1\frac{1}{2}$  mm. longis  $\frac{1}{2}$ – $\frac{2}{3}$  mm. latis. Corolla alba rotata, tubo glabro  $1\frac{1}{2}$  mm. longo  $1\frac{1}{2}$  mm. lato basi truncato haud contracto, limbo 5-partito, segmentis rotundatis basi plus minus cuneato-



contractis  $1\frac{1}{2}$  mm. in diametro glabris. Disci 5 ad basin loborum corollæ affixi flavi pulviniformes  $\frac{1}{2}$  mm. lati  $\frac{1}{4}$  mm. longi orem tubi fere obtegentes. Stamina 5, filamentis filiformibus brevissimis  $\frac{1}{4}$  mm. longis, antheris oblongis  $\frac{1}{3}$ – $\frac{1}{2}$  mm. longis. Ovarium obconicum apice truncatum  $\frac{1}{4}$  mm. longum glabrum, stylo columniformi  $\frac{2}{3}$  mm. longo, stigmate globoso-peltiformi haud lobato; ovarium 4–5-partitum. Nuculæ 4–5 tetrahedri-formes circ. 1 mm. longæ nitido-nigræ leves ad angulos acutæ.

HAB. Giran : Sōseikyaku, leg. B. HAYATA, Mai. 11, 1916.

Remarkable for the leaves with costa impressed above but elevated below, and veins elevated above but impressed below.

## Convolvulaceæ.

### *Parasitipomœa* HAYATA n. g.

***Parasitipomœa formosana*** HAYATA sp. nov. Parasitica aphylla; caulis tereto-filiformis circ. 1 m. longus 2–2 $\frac{1}{2}$  mm. in diametro. Flores cymose 2–3-congesti, cymis longe pedunculatis, pedunculis 10 cm. longis tereto-filiformibus lateraliter sitis, pedicellis  $\frac{1}{2}$ –1 cm. longis basi bracteis instructis, bracteis linearibus 2 cm. longis 2 mm. latis apice acuminatis glabris vel multo minoribus. Calyx 5-partitus, partibus valde inæqualibus 3–exterioribus latioribus oblongo-linearibus 2 $\frac{1}{2}$  cm. longis 7 mm. latis apice acuminatissimis integris extus tenuiter hirsutis intus glabris, 2–interioribus angustissime linearibus 2 mm. latis apice acuminatissimis. Corolla infundibuliformis, tubo 4 cm. longo, limbo 5-lobato. Stamina 5, filamentis basi corollæ ad 5 mm. altitudinem affixis basi dense barbatis cæterum glabris filiformibus circ. 2 cm. longis, antheris linearibus 3 $\frac{1}{2}$  mm. longis  $\frac{2}{3}$  mm. latis apice obtusis basi profunde 2-lobatis, lobis circ. 1 mm. longis  $\frac{1}{4}$  mm. latis obtusis. Discus circum ovarium situs annuliformis  $\frac{1}{4}$  mm. altus. Ovarium ovoideum 1 $\frac{1}{2}$  mm. longum glabrum 3-loculare, loculis 2-ovuliferis, stylo filiformi erecto recto 3 cm. longo, stigmate terminali 2-partito, partibus globosis sessilibus se contactis minute lamellato-botryoideis. Fructus ignotus.

HAB. Akō : Tanashū, leg. G. NAKAHARA, Jan. 1907.

Flowers are nearly the same as those of *Ipomœa*. But, its parasitic and leafless habit is so remarkable that it is sufficient to establish a new genus for it.



## Scrophulariaceæ.

*Microcarpæa* R. BR.

**Microcarpæa muscosa** R. BR.; BENTH. FL. Hongk. p. 253; HOOK. f. FL. Brit. Ind. IV. p. 287; HEMSL. Ind. FL. Sin. II. p. 192; MATSUM. et HAYATA Enum. Pl. Formos. p. 283. Herba minutissima subaquatica repens 3-4 cm. longa ad nodos radicans. Caulis teres  $\frac{1}{2}$  mm. in diametro 1-nervatus glaber. Folia opposita glabra lineari-spathulata 2-3 mm. longa  $\frac{1}{2}$  mm. lata apice obtusissima 1-nervia margine integra basi attenuata caulem semi-amplexantia. Flores axillares sessiles solitarii. Calyx erectus tubuloso-campanulatus 1 mm. longus  $\frac{1}{2}$  mm. latus extus sparse hirsutus intus glaber apice 5-lobatus, lobis ovato-linearibus  $\frac{1}{2}$  mm. longis  $\frac{1}{4}$  mm. latis obtusis basi haud contractis margine ciliolatis. Corolla inclusa 1 mm. longa  $\frac{1}{2}$  mm. lata 2-labiata glabra margine minute ciliolata intus sub microscopio glanduloso-hirsuta, labio superiore minuto  $\frac{1}{8}$  mm. longo 2-lobato, lobis obtusis, labio inferiore majore  $\frac{1}{2}$  mm. longo  $\frac{2}{3}$  mm. lato 3-lobato, lobo medio oblongo-cuneato apice truncato, lobis lateralibus oblongis apice obtusis. Stamina 2 inter lobum centralem et lobos laterales labii inferioris inserta e medio tubi oriunda, filamentis  $\frac{1}{8}$  mm. longis glabris, antheris reniformibus 2-ocularibus. Ovarium oblongum  $\frac{1}{3}$  mm. longum glabrum 2-loculare, stylo columniformi  $\frac{1}{4}$  mm. longo glabro apice oblique truncato stigmatifero.


HAB. in oryzatis Tamsui, leg. U. FAURIE, Nov. 1914.

Compared with a Japanese specimen so named in the Herbarium at Tōkyō.

## Gesneraceæ.

*Rhychoglossum* BLUME.

**Rhychoglossum? Sasakii** HAYATA sp. nov. Herba annua? basi ascendens radicans, radicibus fibrosis. Caulis erectus circ. 10 cm. longus crispato-hirsutus, pilis patentibus. Folia alterna breve petiolata obliqua ovato-oblonga  $6\frac{1}{2}$  cm. longa 3 cm. lata apice acuta vel acuminata basi valde obliqua, latere inferiore rotundata vel rotundato-cordata, latere superiore emeato-acuta, latere inferiore 20 mm. lato latere superiore 12 mm. lato, costa basi interiore

leviter falcato-recurva, margine subintegra vel obscure crenulato-serrulata membranacea supra plus subtus minus hirsuta, petiolis brevissimis 3 mm. longis. Flores racemosi, racemis subsimplicibus secunde floriferis, pedicellis 3 mm. longis hirsutis. Calyx 4-partitus plus minus obliquus, segmentis ovato-oblongis  $2\frac{1}{2}$  mm. longis 2 mm. latis apice obtusissimis basi plus minus obliquis sparse hirsutis. Corolla oblique tubosa 9 mm. longa 3 mm. lata apice 2-labiata, labio superiore late semi-rotundato 1 mm. longo 2 mm. lato apice perfecte rotundato, labio inferiore  $3\frac{1}{2}$  mm. longo  $4-4\frac{1}{2}$  mm. lato 3-lobato, lobis lateralibus oblongis latere exteriori 2 mm. longis latere interiore 1 mm. longis basi haud contractis, lobo terminali 2 mm. longo  $1\frac{1}{2}$  mm. lato, extus glabra intus latere inferiore longe hirsuta, pilis superioribus circ. 1 mm. longis apice globuliferis, pilis inferioribus haud globuliferis. Stamina 4 basi corollæ affixa, filamentis 3 mm. longis basi glabris sursum hirsutis complanatis  $\frac{1}{4}$  mm. latis apice spathulatis 1-nerviis margine dense hirsutis; antheræ uniloculares, loculis ad apicem filamentorum oblique sitis -formibus cordato-reniformibus latere exteriori fusco-hirsuto latere interiore glabro. Ovarium depresso-globosum  $1\frac{1}{2}$  mm. longum 2 mm. latum glabrum, stylo  $1\frac{1}{2}$  mm. longo columniformi apice dilatato 3-lobato. Discus ad latus anterius ovarii situs  $\frac{1}{4}$  mm. longus 1 mm. latus crenulatus. Capsula depresso-globosa  $2\frac{1}{2}$  mm. longa  $3\frac{1}{2}$  mm. lata membranacea. Semina fusiformia rubescentia  $\frac{1}{5}$  mm. longa eleganter tortuose striata, testa crustacea.

HAB. Urai, leg. S. SASAKI, Sept. 1915.

As the specimens are too imperfect, the generic determination is rather conjectural.

## Verbenaceæ.

### *Callicarpa* LINN.

***Callicarpa antacensis*** HAYATA sp. nov. Frutex? Rami sublaeves pallido-cinerascentes, ramulis brevissime densissime villosis. Folia chartacea oblonga vel rhomboideo-oblonga 10–12 cm. longa 5–7 cm. lata apice acuta sed ad summum obtusa basi triangulari-acuta vel -obtusa margine subintegra vel tenuiter serrulata paucissime hirsuta vel subglabrata glandulis minutis dispersa subtus dense vel parce stellato-tomentosa, pilis stellatis  $\frac{1}{3}$  mm. in diametro, costa supra tenuiter subtus prominente elevata, venis lateralibus

primariis utroque latere costæ 8-9 subrectis vel plus minus recurvis supra tenuiter subtus prominente elevatis, venulis inter venas transversis supra haud subtus distincte elevatis, pagine subtus pallidissima glandulis flavis minutis densissime conspersa, petiolis 7 mm. longis dense brevique stellato-tomentosis. Cymæ ad axillas foliorum superiorum sitæ densissime floratæ brevissime stellato-tomentosæ, tomentis demum solutis, pedicellis brevissimis supra basin articulatis, partibus supra articulationem 1 mm. longis glabris apice ad calycem abeuntibus. Calyx tubuloso-obconicus  $1\frac{1}{2}$  mm. longus totiusque latus apice subtruncatus margine 4-5-dentatus, dentibus brevissimis vel obscuris, extus glandulis minutis conspersus intus glaber. Corolla tubuloso-campanulata  $4\frac{1}{2}$ -5 mm. longa  $2\frac{1}{2}$  mm. lata generaliter 4-lobata, lobis subrotundatis  $1\frac{1}{2}$  mm. longis totiusque latis apice rotundatis basi haud contractis, extus intusque glabra. Stamina 4 exserta, filamentis filiformibus glabris 4-5 mm. longis subcrispatis supra basin corollæ insertis, antheris ellipticis 2 mm. longis 1 um. latis dorso valde compressis apice emarginatis basi emarginato-sagittatis dorso facieque prope medium densissime glandulis minutis conspersis, haud versatilibus. Ovarium oblongum 1 mm. longum  $\frac{2}{3}$  mm. latum glandulis minutis densissime conspersum, stylis 7-8 mm. longis filiformibus glabris apice ad stigmata dilatatis.

HAB. Kōtōshō, leg. T. KAWAKAMI et S. SASAKI, Juli. 1912, fl. (No. 38).

Near *Callicarpa cana* LINN.; but differs from it in having obtusely serrulate leaves.

## Aristolochiaceæ.

### *Aristolochia* LINN.

***Aristolochia Shimadai*** HAYATA sp. nov. Herba volubilis basi suffrutescens. Caulis subglaber teres tortuosus multo-striato-sulcatus sursum patentohirsutus. Folia alterna petiolata oblongo-reniformia circ. 10 cm. longa circ. 6 cm. lata, partibus superioribus oblongis 6 cm. longis circ. 4 cm. latis apice obtusissimis, partibus inferioribus reniformibus 4 cm. longis  $5\frac{1}{2}$  mm. latis, basi auriculata, auriculis interiore recurvis (ab apice petioli usque ad apicem auriculæ  $1\frac{1}{2}$  cm. longis 2 cm. latis) margine subintegra 5-7-nervia chartacea, nervis et venis venulis supra leviter elevatis subtus valde elevatis, supra minus subtus

plus dense villosa, venulis reticulatis, petiolis circ. 3 cm. longis villosis. Flores axillares solitarii, pedicellis 2-3 cm. longis villosis medio 1-bracteatis, bracteis ovatis apice obtusissimis basi latis pedicellum amplectantibus 5 mm. longis 4 mm. latis extus sericeo-villosis intus subglabris. Ovarium inferum subnutans densissime patentissime villosum (pilis 1 mm. longis) 8 mm. longum 2 mm. latum profunde 6-sulcatum 6-loculare, (loculis 1-seriatim ovuliferis), sulcis  $\frac{1}{4}$  mm. latis, angulis obtusissimis in sectione rotundatis. Perianthium  $v$ -formiter recurvum extus minute brevissime villosum simul longe hirsutum intus deorsum minute tuberculatum sursum glabrum læve, tubo U-formi 2 cm. longo e basi supra medium 6 mm. lato supra medium usque ad apicem angustato 3-4 mm. lato, limbo ad apicem tubi oblique verticaliter sito  $1\frac{1}{2}$  cm. longo totiusque lato plano parce minuteque hirsuto  $\nabla$ -formi centro circum orem tubi oblique minute elevato-annulato reticulato. Stamina 6 cum styli connata sessilia, antheris linearibus inter strias stigmatiferas styli geminatim sitis 2 mm. longis  $\frac{2}{3}$  mm. latis apice brevissime apiculatis. Stylus columniformis crassus 3 mm. longus cum antheris  $1\frac{1}{2}$  mm. crassus apice 3-lobatus supra antheras 1 mm. productus, lobis semi-rotundatis 1 mm. longis  $1\frac{1}{2}$  mm. latis.

HAB. Shimpō, Shinchikuchō, leg. Y. SHIMADA, Dec. 15, 1915.

Near *Aristolochia Kämpferi* WILLD., but distinguishable from it in much longer leaves and smaller flowers. Also resembles *A. Fordiana* HEMSL., but differs from it in having quite obtuse leaves.

## Laurineæ.

### *Beilschmiedia* NEES.

***Beilschmiedia erythrophloia*** HAYATA Ic. Pl. Formos. IV. p. 20 et V. p. 150. Descriptio aucta: Flores pallido-flavescentes laxè paniculati; paniculis ad ramulos hornotinos lateraliter vel axillariter dispositis divaricatis cum pedunculis 6-8 cm. longis (pedunculis 2-3 cm. longis), ramis panicularum patentissimis, pedicellis ultimis 5-10 mm. longis toto glabris. Perianthii tubus obconicus  $\frac{2}{3}$  mm. longus  $1\frac{1}{2}$  mm. in diametro glaber, lobis 6 subæqualibus oblongis 2 mm. longis  $1\frac{1}{2}$  mm. latis apice obtusis basi vix vel haud contractis extus glabris intus glabris concavis margine vix ciliolatis vel haud ciliolatis. Stamina ordinis I. et II. æqualia, filamentis late linearibus  $\frac{2}{3}$  mm. longis  $\frac{1}{2}$  mm.



latis complanatis, antheris adnatis ovatis 2-locularibus  $\frac{2}{3}$  mm. longis apice obtusis introrsum dehiscentibus; stamina ordinis III. filamentis plus minus hirsutis basi utroque latere glandulis rotundatis  $\frac{1}{4}$  mm. longis totiusque latis instructis, antheris elongato-ovatis  $\frac{2}{3}$  mm. latis; ordinis IV. staminodia sessilia rhomboidea acuta  $\frac{1}{2}$  mm. longaque lata. Ovarium ovoideum  $\frac{2}{3}$  mm. longum et latum glabrum 1-loculare, stylo columniformi glabro 1 mm. longo apice truncato stigmatoso.

HAB. Baikai, ad 2000 ped. alt., leg. B. HAYATA, Aprili. 1916.

## Thymelæaceæ.

### *Wikstrœmia* ENDL.

**Wikstrœmia mononectaria** HAYATA Ic. Pl. Formos. V. p. 179.

Descriptio aucta: Fructus baccæformis ovoideus cum stipitibus 6 mm. longus 3 mm. latus apice angustatus ad summum obtusus basi attenuatus ad stipitem abeuns, stipitibus circ.  $1\frac{1}{2}$ –2 mm. longis, monospermus. Semina ovoidea 4 mm. longa 2– $2\frac{1}{2}$  mm. lata apice plus minus angustato-rostrata obtusa basi rotundata et brevissime apiculata, testa crustacea nigricanti latere uno hilo notata, albumen carnosum sparsum. Embryo amplus; radicuula supra brevis 1 mm. longa apice acutissima; cotyledonibus ovatis  $2\frac{1}{2}$ –3 mm. longis  $1\frac{2}{3}$  mm. latis crassiusculis.

HAB. Uraisha, leg. S. SASAKI, Sept. 1915, (fr.).

## Loranthaceæ.

### *Loranthus* LINN.

**Loranthus liquidambaricolus** HAYATA sp. nov. Frutex parasiticus ad truncos *Liquidambaris* incolus, ramis cinerascens minutis lenticellatis. Folia crasse coriacea oblonga vel ovato-oblonga 7 cm. longa 4 cm. lata apice truncato-rotundata basi acuta subito ad petiolum abeuntia, costis et venis utraque pagine tenuissime elevatis gracillimis, petiolis 12 mm. longis subalatis hand sulcatis subteretibus. Cymæ laterales 3-floratæ. Tubus perianthii cylindricus 18 mm. longus 3 mm. latus basi truncatus medio sursum gradatim angustior apice plus minus expansus, ab apice deorsum usque ad 5 mm. latere uno fissus extus brevissime hirsutus intus subglaber; lobis 4 linearibus 6 mm. longis  $1\frac{1}{3}$  mm. latis



apice obtusis retrorse flexis tubo contactis apice sursum (interiore) recurvis valvatis crassiusculis basi haud contractis. Stamina 4 lobis perianthii opposita, filamentis totis cum tubo perianthii connatis; antheris sessilibus linearibus  $4\frac{1}{2}$  mm. longis  $\frac{2}{3}$  mm. latis apice acutis apice 2-dentatis, (dentibus triangularibus brevissimis), loculis linearibus a medio deorsum recurvis subglabris. Stylus 23 mm. longus filiformis in sectione pentagonus glaber, stigmatе terminali coniformi. Fructus obconico-cylindricus 6 mm. longus 3 mm. in diametro sectionis.

HAB. Nantō : kyōshiryō, leg. T. SōMA, Nov. 1915, ad truncos *Liquidambaris formosanae* crescens.

**Loranthus Owatarii** HAYATA in MATSUM. et HAYATA Enum. Pl. Formos. p. 357. Descriptio aucta: Flores ♂: lacteo-flavi patentissimi circum nodos spicae 4-glomeratim siti sessiles, bracteis triangularibus 1 mm. longis acutis transverse patentibus. Involucrum cupuliforme  $1\frac{1}{2}$  mm. in diametro  $\frac{2}{3}$  mm. longum margine sub lente minute denticulatum vel sub-integrum. Perianthii segmenta 6 patentissima linearia oblanceolata  $2\frac{1}{2}$  mm. longa  $\frac{2}{3}$  mm. lata apice obtusa vel truncata glabra laevia distincta. Stamina 6 cum segmentis opposita, filamentis basi ad basin segmentorum adnatis sursum liberis 2- $2\frac{1}{2}$  mm. longis cum segmento aequilongis glabris incrassatis, antheris oblongis adnatis apice truncatis vel emarginatis 4-locularibus, loculis operculatim dehiscentibus. Rudimentum ovarii brevissimum margine 5-dentatum, stylo columnari  $1\frac{1}{2}$  mm. longo.

HAB. Oiwake, ad 7500 ped. alt., ad truncos *Querci Morii*, Aprili. 1916, leg. B. HAYATA.

### *Viscum* LINN.

**Viscum Alni-formosanae** HAYATA sp. nov. (Fig. 3.) Furcatim ramissimum, ramis patentissimis teretibus rectis. Folia ad apicem ramulorum oppositum sita oblongo-obovata 4-5 cm. longa 12-18 mm. lata apice rotundata basi longe cuneato-attenuata integra crassiuscule coriacea 3-5-nervia sessilia vel breve petiolata. Cymae terminales sessiles 5 mm.-10 mm. longae ternatim decussatimque ramosae, floribus sessilibus cum rhachibus flavescentibus. Flores basiales utroque latere bracteis acute triangularibus 1- $1\frac{1}{2}$  mm. longis margine aristato-serrulatis dorso carinatis crassiusculis glabris instructi, laterales et

terminales haud bracteati, sed involucri crustaceis instructi. Perianthium campanulatum  $2\frac{1}{2}$ –3 mm. longum  $3\frac{1}{2}$ –4 mm. latum crassiusculum coriaceum glabrum; tubo  $1\frac{1}{2}$ –2 mm. longo oboconico, lobis rotundato-triangularibus vel oblongo-triangularibus 2 mm. longis totiusque latis vel latoribus apice exteriore recurvis glabris; antheris 3–4 cum lobis perianthii oppositis et eos adnatis oblongis vel oblongo-linearibus  $1\frac{1}{2}$ –2 mm. longis facie multiporosis; rudimentum ovarii nullum. Fl. ♀: sessiles vel brevissime stipitati; ovarium viride inferum oboconico-lineare  $1$ – $1\frac{1}{2}$  mm. longum 1 mm. latum glabrum; perianthium 4-partitum, segmentis oblongo-triangularibus glabris incrassatis coriaceis apice obtusis basi articulatim solutis; stamina nulla; stylus globosus 1 mm. longus totiusque latus apice rotundatus stigmatosus.

HAB. Musha: Tsutsujigaoka, ad 6000 ped. alt., ad *Alnum formosanam* crescens, leg. B. HAYATA, Aprili. 23, 1916.

Approaches to *Viscum album* LINN., but differs from it in the male flowers

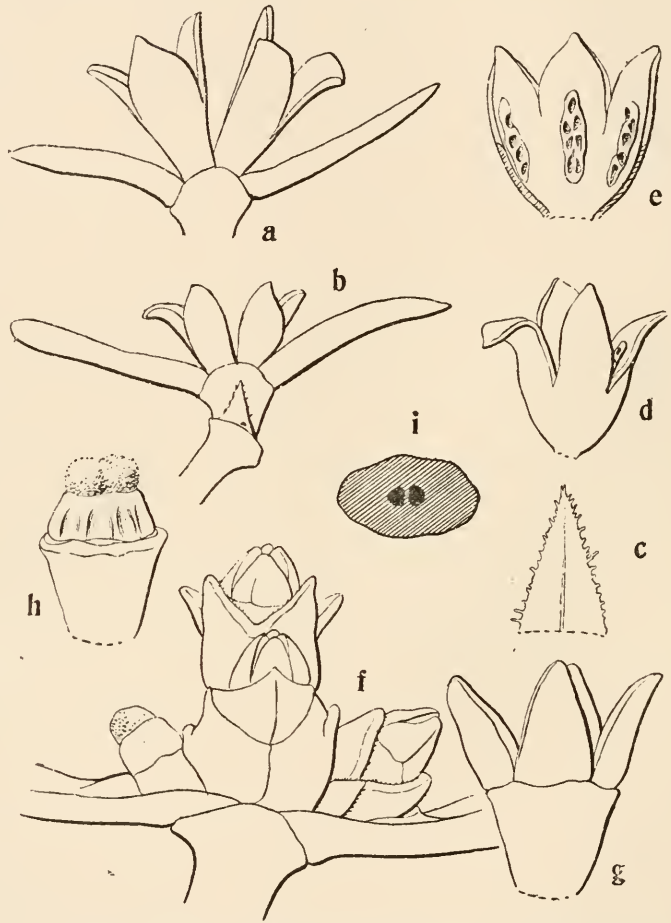


Fig. 3, *Viscum Alni-formosanæ* HAYATA. a, b, pairs of male flowers; c, a bract; d, a male flower; e, section of the same; f, female flower-cluster; g, a flower of the same; h, the same, perianth off; i, section of ovary.

which are usually in pair at the top of the branches, and in the much narrower perianth-segments of the same flowers.

**Viscum diospyrosicolum** HAYATA Ic. Pl. Formos. V. p. 192. Descriptio aucta: Juvenile foliiferum, foliis oppositis oblongo-obovatis  $1\frac{1}{2}$  cm. longis  $4\frac{1}{2}$  mm. latis apice obtusissimis basi cuneatis margine integris chartaceis glabris venis haud visis sessilibus. Fl. ♂: involucri tenuiter crustaceum cupuliforme margine obscure denticulatum. Perianthium circ. ad basin 4-lobatum, lobis oblongo-triangularibus  $1\frac{1}{4}$  mm. longis  $\frac{3}{4}$  mm. latis apice acutis basi haud contractis crassiusculis leviter deorsum reflexis extus minute sub lente botryoideo-tuberculatis glabris. Antherae 4 ad medium loborum perianthii adnatæ oblongæ 5–6-porosæ. Rudimentum ovarii nullum. Pseudofructus ellipsoideus  $4\frac{1}{2}$  mm. longus 2 mm. latus apice obtusus ad centrum summi breve apiculatus lævis.

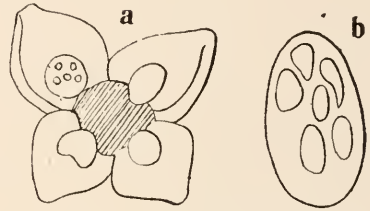


Fig. 4, *Viscum diospyrosicolum* HAYATA; a, a male flower; b, an anther.

HAB. Kyōshiryō, leg. B. HAYATA, 2200 ped. alt., Aprili. 1916, (fl. ♂).

## Euphorbiaceæ.

### *Daphniphyllum* BLUME.

**Daphniphyllum membranaceum** HAYATA sp. nov. Arbor, ramis et ramulis validiusculis cicatricibus foliorum notatis haud lenticellatis. Folia alterna versus apicem ramulorum approximatin disposita longe petiolata oblongo-elliptica vel oblongo-lanceolata circ. 20 cm. longa 6 cm. lata apice acutissima vel breve cuspidata basi obtusa margine subintegra supra nitida viridissima subtus glauca chartacea vel chartaceo-membranacea, costa supra plana vel tenuiter impressa subtus prominenti, venis lateralibus primariis utroque latere costæ 15–20 rectis vel plus minus flexuosis haud arcuatis gracillimis utroque pagine tenuiter elevatis a costa angulo  $45^\circ$  egressis, petiolis circ. 5 cm. longis rectis supra sulcatis basi plus minus dilatatis. Racemi florum ♀ versus apicem ramorum sub foliis supra cicatrices foliorum dispositi gracillimi glabri erecti recti 12 cm. longi laxissime floriferi, pedunculis 5–6 cm. longis, pedicellis gracillimis glabris 2 cm. longis divaricatissimis, bracteis

caducissimis haud visis. Flores ♀: perianthii segmenta interdum complete ad nullum reducta, vel interdum brevissima glandulæformia 7-8 apice peltato-truncata  $\frac{1}{4}$  mm. longa totiusque lata distincta. Ovarium glabrum oblongum glabrum 2 mm. longum apice ad stylum  $\frac{2}{3}$  mm. longum attenuatum basi obtusum, stigmate terminali subpeltato 2-fido, segmentis latissimis  $\frac{2}{3}$  mm. longis subrotundatis ad apicem styli contactis, ovarium 2-loculare.

HAB. Rankanzan, leg. B. HAYATA, Mai. 1916.

Near *D. macropodum*, but different from it in the much thinner leaves, in the more or less rostrate ovaries and nearly obsolete perianth-segments.

***Cyclostemon* BLUME.**

***Cyclostemon hieranense* HAYATA sp. nov.** Arbor? ramis et ramulis gracilibus, cortice cinerascenti, lenticellis albicantibus minutis elevatis. Folia alterna in exsiccatō pallido-cinerascētia tenuiter coriacea oblongo-elliptica vel oblongo-lanceolata apice caudato-acuminata basi oblique acuta 12 cm. longa 4 cm. lata margine integra tenuiter deorsum recurva plus minus margine crispato-undulata, costa utraque elevata, venis venulis reticulatis supra minus subtus plus elevatis, venis primariis lateralibus utroque latere costæ 8-10 tenuissimis arcuatis prope marginem reticulatis, utraque pagine glaberrima, petiolis 8 mm. longis semiteretibus fusco-coloratis. Flores ad partes inferiores efoliatis ramurorum hornotinorum lateraliter siti ad nodos 2-3-fasciculati graciliter pedicellati, pedicellis filiformibus 1 cm. longis, bracteis flores 2-3 includentibus caducissimis rotundatis apice triangularibus 7 mm. longis 6 mm. latis dense ciliatis coriaceis valde concavis. Sepala 4 patentia rotundata glabra 4 mm. longa 3 mm. lata apice rotundata margine ciliata. Stamina 7-10 circum rudimentum ovarii disposita, filamentis glabris  $1\frac{1}{2}$  mm. longis, antheris oblongis utrinque emarginatis  $1\frac{1}{2}$  mm. longis 1 mm. latis. Rudimentum ovarii plano-compressum  $2\frac{1}{2}$  mm. in diametro margine repando-lamellatum plicatum. Fl. ♀ ignoti.

HAB. Hieranzan, leg. S. SASAKI, Feb. 1912.

Near *C. karapinense*; but differs from it by the much more acuminate and thicker leaves.

## Urticaceæ.

*Fleurya* GAUDICH.

***Fleurya interrupta*** GAUD. ; MATSUM. et HAYATA *Enum. Pl. Formos.* p. 381. Herba annua? radicibus fibrosis. Caulis subteres 30–40 cm. longus sparse hirsutus. Folia alterna petiolata triangulari-cordata membranacea 9–10 cm. longa 7–8 cm. lata apice triangulari-acuminata (acuminibus integris linearibus 1 cm. longis 3 mm. latis apice acutis) basi late truncata vel truncato-cordata margine grosse serrata, (serris sub-triangularibus 4 mm. longis 6 mm. latis apice acutis basi latissimis superioribus gradatim minoribus) margine brevissime ciliolata trinervia, nervis lateralibus extrorse 5-veniferis, venis et nervis prope serras furcatim ramosis, ramulis ad apicem serrarum convergentibus, utraque sparse hirsuta, petiolis 7–9 cm. longis gracillimis hirsutis vel subglabris, stipulis 2 subaxillaribus lineari-filiformibus circ. 1 cm. longis basi 1 mm. latis apice filiforme acuminatis dorso prominente carinatis intus glabris extus hirsutis. Spicæ a basi usque ad apicem caulis sitæ axillares solitariae longe pedunculatæ cum pedunculis 8–10 cm. longæ, (pedunculis circ. 5 cm. longis gracillimis ascendentibus), pauce ramosæ, ramis spicæ circ. 5 mm. longis remote sitis. Flores ♀ ad ramos spicæ densissime cymose glomeratimque dispositi, pedicellis subnullis vel  $\frac{1}{2}$  mm. longis. Perianthium fructiferum oblique globoso-obconicum 1 mm. longum totiusque latum glabrum vel sparse hirsutum inæqualiter 4-lobatum, lobis subtriangularibus  $\frac{1}{2}$  mm. latis  $\frac{1}{3}$  mm. longis margine denticulatis; staminodia nulla. Styli ad apicem ovarii oblique siti a basi 2-partiti, parte una longiore filiformi  $\frac{2}{3}$  mm. longa rubescenti descendento-recurva, parte una brevissima  $\frac{1}{10}$  mm. longa vel obsoleta. Achænium valde complanatum triangulari-cordiforme  $1\frac{1}{2}$  mm. longum 1 mm. latum sublaeve angustissime alatum, pericarpis crustaceis.

HAB. AKŌ, leg. T. SŌMA, Sept. 1913, (fr. et ♀).

*Pilea* LINN.

***Pilea brevicornuta*** HAYATA sp. nov. (Fig. 5.) Herba; caulis basi procumbens ad nodos radicans, (radicibus fibrosis), sursum ascendens erectus sursum foliatus hirsutus (pilis horizontaliter patentibus  $\frac{1}{2}$  mm. longis) simul glanduloso-rubro-punctatis. Folia opposita (jugis a se 2 cm. distantibus),



longe petiolata ovato-oblonga vel ovato-lanceolata  $4\frac{1}{2}$  cm. longa 18 mm. lata apice acuminata basi triangulari-acuta vel obtusa margine basi apiceque excepto serrata (serris ascendentibus late triangularibus obtusis a se 3 mm. distantibus), trinervia, (nervis lateralibus ad apicem serrarum attingentibus), venis lateralibus primariis nervorum sub apicibus serrarum glandula singula calcaria terminatis, pagina supra cystolithis  $\frac{6}{10}$  mm. longis rectis conspersa subtus glabra, petiolis 6–7 mm. longis glabris supra sulcatis, stipulis intra-axillaribus castaneis membranaceis ovato-oblongis  $4\frac{1}{2}$  mm. longis 3 mm. latis apice obtusissimis basi caulem semi-amplexantibus glabris. Flores monœcii vel diœcii. Fl. ♂ cymosi, cymis solitariis vel geminatis axillaribus pedunculatis, pedunculis glabris  $1\frac{1}{2}$ –2 cm. longis apice ramosis plus minus hirsutis ad nodos bracteatis, bracteis oblongis 1 mm. longis apice erosis, pedicellis ultimis  $\frac{2}{3}$  mm. longis. Perianthium

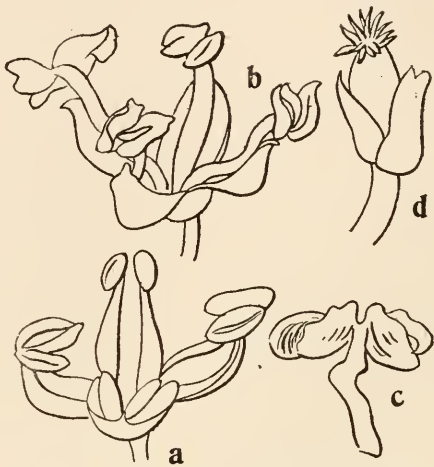


Fig. 3, *Pilea brevicornuta* HAYATA; a, b, male flowers; c, a stamen; d, a female flower.

rubescens 4-lobatum, tubo obconico 1 mm. lato glabro, lobis oblongis 2 mm. longis  $1\frac{1}{3}$  mm. latis apice cornuto-acutis glabris basi non contractis intus plus minus concavis glabris. Stamina 4, filamentis 2 mm. longis linearibus  $\frac{1}{3}$  mm. latis; antheris roseis, loculis divaricatis. Rudimentum ovarii minutum setiforme. Flores ♀ cymosi, cymis brevioribus inferioribus quam iis floribus ♂, breve pedunculatis cum pedunculis  $\frac{1}{2}$  cm. longis generaliter geminatis ad axillas foliorum sitis glabris bracteatis ramosissimis, floribus ad nodos glomeratis bracteatis, bracteis oblongo-triangularibus basi pedicelli ultimi sitis minutis  $\frac{1}{4}$  mm. longis, pedicellis ultimis  $\frac{1}{2}$ – $\frac{2}{3}$  mm. longis. Perianthium fructiferum viride 3-partitum, segmentis inaequalibus, postico longiore oblongo  $\frac{1}{2}$  mm. longo glabro intus concavo apice truncato vel obtusissimo, segmentis lateralibus ovato-triangularibus  $\frac{1}{3}$  mm. longis apice acutis intus valde concavis glabris; rudimenta staminum 3 crassiuscula  $\frac{2}{3}$  mm. longa  $\Omega$ -forme recurva. Achaenium castaneum ovatum  $\frac{3}{4}$  mm. longum  $\frac{1}{2}$  mm. latum biconvexum apice obtusissimum basi con-

tractum, (stigmatē sessili infra apicem ovarii latere sito brevissime pectinato) rubescens rubro-punctatum, pericarpio coriáceo-crustáceo. Semina ovata utrinque acuta, testa membranacea. Embryo ignotus.

HAB. Mt. Arisan: inter Heishana et Nimandaira, Mart. 1914, leg. B. HAYATA.

Near *Pilea umbrosa* WEDD., but differs from it by the leaves which are usually acute at the base.

***Pilea funkikensis*** HAYATA sp. nov. Herba subsucculenta altissima erecta aggregatim abundante crescens. Caulis 60–200 cm. altus vel altior glaber simplex haud ramosus subtetragonus 4 mm. crassus medio sursum foliatus erectus. Folia opposita (jugis a se 3–5 cm. remotis) longe petiolata in exsiccatō chartacea in vivo crassiuscula elongato-ovato-oblonga vel elongato-oblonga 12–14 cm. longa  $4\frac{1}{2}$ –5 cm. lata apice breve caudato-acuta (acuminibus 1 cm. longis) basi cuneato-obtusa obtusa vel rotundata margine tenuiter remoteque serrulata (serrulis ascendētibz ab apice ad apicē 5 mm. distantibus) trinervia, nervis supra impressis subtus elevatis, pagine supra dense subtus minus dense cystolithis vermiformibus conspersa, cystolithis  $\frac{1}{5}$ – $\frac{3}{5}$  mm. longis, petiolis 3–6 cm. longis glabris, stipulis intra-axillaribus non satis notis. Flores diceii vel monœcii, (si monœcii tunc inflorescentiæ floris fœminei superiores, inflorescentiæ floris masculini inferiores). Flores toto cymosi, cymis axillaribus solitariis vel geminatis. Cynæ floris ♂: quam eæ fl. ♀ longiores et plus expansæ 3–5 cm. longæ 2–4 cm. latæ sessiles vel breve pedunculatæ ramosissimæ glabræ ad nodos glomeratim dense floriferæ ad nodos bracteati, bracteis latè triangularibus 1 mm. longis  $1\frac{1}{2}$  mm. latis apice obtusis basi haud contractis glabris; flores 10–30 ad nodos glomerati sessiles basi 1–bracteati, bracteis oblongis  $1\frac{1}{2}$  mm. longis  $\frac{2}{3}$  mm. latis vel minoribus apice acutis glabris; alabastrum floris ♂ obovoideum  $1\frac{1}{2}$  mm. latum apice cornibus erectis brevissimis segmentorum breve apiculatum glabrum; apertientes leviter rosci. Perianthium campanulatum, tubo 1 mm. in diametro intus eupulæformi, 4-lobatum, lobis oblongis 1 mm. longis  $\frac{2}{3}$  mm. latis apice minute inflexis triangulari-acutis basi haud contractis intus valde concavis extus dorso infra apicē brevissime cornutis, cornibus erectis minutissimis triangulari-acutis; stamina 4 lobis perianthii opposita e basi lorum oriunda, filamentis linear-

bus glabris  $1\frac{1}{2}$  mm. longis quam labo plus minus longioribus in alabastro inflexis, antheris oblongis dorso infra apicem glandula singula  $\frac{1}{5}$  mm. longa retrorse elevata rubra instructis; rudimentum ovarii conicum minutissimum. Cynæ floris ♀ quam cæ fl. ♂ breviores superiores  $1-1\frac{1}{2}$  cm. longæ totiusque latæ sessiles vel breve pedunculatæ; flores ad nodos densissime glomerati; perianthium acheniferum 2-4-partitum vel lobatum, segmentis linearibus vel quadrangularibus  $\frac{2}{3}-\frac{1}{2}$  mm. longis margine erosis apice truncate haud cornutis glabris; rudimenta staminis 2 vel 4, filamentis ad nullum reductis, antheris abortis sessilibus minutissimis quadrangularibus  $\frac{1}{10}-\frac{1}{5}$  mm. longis. Achenium oblongum plus minus obliquum  $1\frac{1}{4}$  mm. longum  $\frac{2}{3}$  mm. latum apice brevissime et lateque apiculatum ad summum stigmatē terminatum basi contractum acutum brevissime stipitatum biconvexum complanatum lentiforme leve minute rubropunctatum, maturum ignotum; embryo ignotus.

HAB. Mt. Arisan: inter Toroyen et Fumkiko, leg. B. HAYATA et TAKEO ITÔ, Mart. 1914; Nimandaira, leg. T. SÔMA, Jan. 1915.

Near *Pilea petiolaris* BLUME, but differs from it in having much longer and thicker leaves.

***Pilea kankaoensis*** HAYATA sp. nov. Annuæ. Caulis 15-25 cm. longus succulentus glaber deorsum ciliatus sursum foliatus 5 mm. in diametro sectionis. Folia versus apicem caulis oppositim disposita a se 3-2-1 cm. distantia longe petiolata ovato-oblonga vel obovato-oblonga  $2\frac{1}{2}-5$  cm. longa  $1\frac{1}{2}-2\frac{1}{2}$  cm. lata apice caudata ad summum caudæ obtusissima basi obtusissima rotundata vel truncata sed ad apicem petioli semper minute cordata  $\curvearrowright$ -formia margine integerrima crassiuscula plus minus succulenta supra fusco-viridia plus minus iridescentia supra cystolithis verruciformibus  $\frac{1}{2}-\frac{3}{5}$  mm. longis conspersa subtus in exsicco alveoli-forme elevato-reticulata in vivo haud reticulata glaberrima 3-nervia, nervis in exsicco supra impressis subtus tenuissime elevatis gracillimis, nervo centrali ad acumen ipsum extenso, nervis lateralibus a margine 2-3 mm. distantibus margini parallelis sursum gradatim evanescentibus, venis transverse dispositis tenuissimis; petiolis 2-3 cm. longis teretibus cystolithis conspersis, stipulis intra-axillaribus latere interiore se connatis late triangularibus apice acutis vel obtusis 1 mm. longis 2 mm. latis. Flores monœcii corymboso-paniculati; paniculis ad folia superiora axillaribus cum

pedunculis 8–10 cm. longis, pedunculis 6–7 cm. longis, ramis paniculae pedato-patentibus glabris, rhachibus valde flexuosis glabris incrassatis ad nodos flores quasi-glomeratim gerentibus. Fl. ♂: sessiles; alabastrum obovoideo-globosum apice obtuse truncatum cornibus 4 brevissimis instructum basi obtusum; flores apertientes patentissimi, perianthii lobis oblongo-linearibus  $1\frac{1}{2}$  mm. longis 1 mm. latis apice acutis dorso sub apice brevissime cornutis utraque pagine glabris distincte 1-costatis; stamina 4, lobis perianthii opposita, filamentis ad  $\frac{1}{2}$  mm. perianthio adnatis sursum liberis, partibus liberis 1 mm. longis cum lobis perianthii æquilongis complanatis glabris inflexis, antheris ovatis apice emarginatis basi profunde cordatis vel profunde 2-lobatis 1 mm. longis. Fl. ♀: pedicelli  $\frac{1}{6}$ – $\frac{1}{10}$  mm. longi brevissimi basi 1-bracteati, bracteis triangulari-ovatis  $\frac{1}{4}$  mm. longis obtusis vel breve 2-lobatis glabris; perianthium 4-partitum, segmentis valde inæqualibus, uno majore erecto concavo crassiusculo, alteris lanceolatis tenuissimis hyalinis  $\frac{1}{3}$  mm. longis acuminatis; staminodia nulla; ovarium obovoideo-ellipsoideum stigmate excepto  $\frac{1}{3}$  mm. longum glabrum 1-loculare 1-ovulatum, ovulis erectis, stigmate sessili pectinato-cristato; achenium oblique ovato-oblongum apice obtusum plus minus recurvum basi cuneato-acutum glabrum minus quam 1 mm. longum  $\frac{1}{2}$  mm. latum latere plus minus complanatum biconvexum, pericarpio fulvescenti crustaceo. Semina ovoidea  $\frac{2}{3}$  mm. longa apice acuta basi rotundata plus minus complanata lævia glabra, testa membranacea; albumen paucum; embryo medioerius subovatus  $\frac{1}{3}$  mm. longus; radícula supra brevis dimidium cotyledonis in longitudine æquans coniformis apice obtusa; cotyledones late rotundatæ latiores quam longæ.

HAB. Kōshūn: Kankao, leg. Z. KOBAYASHI, Juli. 1907, fl. ♂ (No. 5616); ibidem, leg. S. KAWAGOI, Oct. 1914, (fl. ♀ et fructus).

Near *P. lancifolia* HOOK. f.

***Pilea minute-pilosa*** HAYATA sp. nov. Herba subsucculenta humilis 10–15 cm. alta. Caulis erectus basi paucè ramosus a basi sursum foliatus glaber. Folia opposita parva elliptico-ovata vel oblonga maxima  $5\frac{1}{2}$  cm. longa 2 cm. lata apice caudato-acuminata (acuminibus 1 cm. longis ad summum obtusis) basi obtusissima vel rotundata ad extremitatem basis minute cordata  $\Lambda$ -formia margine subintegra vel obscure minuteque crenulata in exsiccatō membranacea in vivo crassiuscula 3-nervia, nervis lateralibus cum margine



parallelis prope basin acuminis evanescentibus, nervis supra impressis subtus elevatis, pagine supra (nervis exceptis) cystolithis minutissimis  $\frac{3}{5}$ – $\frac{1}{5}$  mm. longis densissime conspersa subtus toto glabra, petiolis maximis  $1\frac{1}{2}$  cm. longis teretibus glabris, stipulis triangularibus minutis axillaribus. Flores dioecii, masculini ignoti. Fl. foeminei cymosi, cymis gracilibus glabris ad folia superiora axillaribus pedunculatis cum pedunculis 3–4 cm. longis ramosis ad nodos glomeratim floratis, ad nodos bracteatis, bracteis triangularibus minutissimis  $\frac{1}{5}$  mm. longis obtusis; flores brevissime pedicellati, pedicellis  $\frac{2}{5}$  mm. longis apice peltato-dilatatis cum flore articulatis, peltis fulvo-flavis; segmenta perianthii minutissima ignota. Achænium fusco-rubescens ovatum obliquum complanatum lentiforme utrinque acutum muricatum. Semina conico-ovata apice acuta basi rotundata complanata  $\frac{2}{5}$  mm. longa  $\frac{1}{2}\frac{2}{5}$  mm. lata, testa membranacea castanea; albumen paucum; embryo conico-ovatus complanatus  $\frac{1}{2}\frac{3}{5}$  mm. longus  $\frac{9}{5}$  mm. latus apice acutus basi rotundatus; radícula coniformi apice acuta  $\frac{6}{5}$  mm. longa cotyledones in longitudine æquans; cotyledonibus late rotundatis  $\frac{6}{5}$  mm. longis  $\frac{9}{5}$  mm. latis.

HAB. Pokupokusha, leg. U. MORI, Jun. 1912.

Differs from *P. kankaensis* HAY., in having smaller leaves with much smaller verniformed cystoliths on the upper surface.

***Pilea ovatinucula*** HAYATA sp. nov. Herba subsucculenta 40–60 cm. longa glaberrima. Caulis erectus rectus sursum foliatus. Folia tenuissime membranacea ovato-oblonga vel ovato-lanceolata, mediocria 11 cm. longa 4 cm. lata apice acuminata, acuminibus linearibus  $1\frac{1}{2}$  cm. longis 1–2 mm. latis ad summum obtusis, basi semper obtusa margine (basi acumineque integro excepto) serrulata, serrulis ascendentibus obtusis a se 4 mm. remotis brevissimis, 3–nervia, nervis supra tenuiter impressis subtus elevatis, utraque pagine cystolithis verniformibus  $\frac{1}{10}$ – $\frac{1}{5}$  mm. longis minute conspersa, nervis lateralibus medio a margine 8 mm. distantibus cum margine subparallelis usque ad acuminem attingentibus et ibi evanescentibus, venis venulisque transverse reticulatis, petiolis  $1\frac{1}{2}$ –3 cm. longis teretibus glabris, stipulis intra-axillaribus triangulari-cuspidatis castaneis membranaceis. Flores dioecii. Fl. ♀: spicato-paniculati, paniculis axillaribus 10–13 cm. longis glabris gracilibus erectis ramosis, ramis patentissimis; floribus secus rhachin spicatum glomeratim dispositis, bracteis minutis oblongo-triangularibus glabris.



Perianthium fructiferum 3-partitum, segmentis inaequalibus, segmento posteriore longiore  $\frac{4}{5}$  mm. longo lineari dorso carinato intus concavo glabro, segmentis lateralibus ovato-triangularibus minoribus glabris; rudimenta staminum 3 crassa linearia  $\frac{1}{2}$  mm. longa  $\Omega$ -forme recurva. Achaenium elongato-oblongum  $\frac{2}{3}$  mm. longum bicovexum sublaeve basi apiceque obtusum, stigmate apice ovarii oblique sito, pericarpio crustaceo; testa seminis membranacea; albumen paucum; embryo  $\frac{1}{3}$  mm. longus.

HAB. Mt. Arisan, leg. B. HAYATA, Jan. 1912.

Distinguishable from *P. rotundinucula* by the oblong nutlets.

**Pilea rotundinucula** HAYATA sp. nov. Rhizoma repens longum teres; caulis ascendens suberectus 30–60 cm. longus glaber (subtetragnus?). Folia opposita in vivo herbaceo-crassiuscula in exsiccatō rigido-chartacea lanceolata vel oblanceolata longe petiolata, maxima 21 cm. longa 5 cm. lata apice acuminata basi acuminata ad petiolum abeuntia margine subintegra remotissime mucronibus instructa trinervia, nervis angulo acuto a se divaricatis basi usque 5 mm. conjugatis, nervis lateralibus cum margine parallelis a margine 1 cm. distantibus, nervis in exsiccatō utraque pagine elevatis, venis venulisque transverse reticulatis, utraque pagine cystolithis verniformibus minutissimis  $\frac{1}{10}$  mm. longis conspersa, petiolis 1–4 mm. longis subteretibus, stipulis intra-axillaribus ovato-triangularibus  $1\frac{1}{2}$  mm. longis 1 mm. latis castaneis membranaceis. Flores monœcii vel diœcii: si monœcii floribus femineis superioribus quam iis masculinis. Fl. ♂ cymosi, cymis axillaribus cum pedunculis 2–3 cm. longis glabris ramosissimis densiuscule floriferis, bracteis minutis ovato-triangularibus apice acutis vel obtusis, pedicellis ultimis  $\frac{1}{5}$ –1 mm. longis glabris. Perianthium 4-lobatum glabrum, lobis glabris tennibus 2 mm. longis  $1\frac{1}{4}$  mm. latis apice dorso brevissime globuloso-apiculatis haud carinatis. Stamina 4, lobis perianthii opposita, filamentis glabris linearibus 2 mm. longis  $\frac{1}{2}$  mm. latis, antheris cordiformibus leviter latioribus quam longioribus apice basique 2-lobatis, loculis sursum arcte contactis basi late divaricatis. Rudimentum ovarii setuloso-conicum glabrum minutissimum. Fl. ♀ cymosi, cymis superioribus glabris. Perianthium fructiferum 3-partitum, segmentis 3 inaequalibus glabris, segmento posteriore oblongo-lineari  $1\frac{1}{4}$  mm. longo glabro naviculiformi apice interiore recurvo dorso carinato intus concavo, segmentis lateralibus ovato-

triangularibus  $\frac{2}{3}$  mm. longis  $\frac{1}{2}$  mm. latis apice acutis intus concavis dorso sub apice globuloso-cornutis. Rudimenta staminum 3 crassa 1 mm. longa  $\frac{1}{3}$  mm. lata  $\Omega$ -forme recurva. Achaenium rotundatum 1 mm. in diametro apice basique oblique obtusum laeve biconvexum, stigmate ad apicem ovarii plus minus oblique sito breve pectinato, pericarpio crustaceo. Semina rotundata  $\frac{2}{3}$  mm. longa, testa membranacea; embryo ignotus.

HAB. Mt. Arisan, prope Funkiko, Jan. 1912, leg. B. HAYATA.

**Pilea Somai** HAYATA sp. nov. Herba; caulis 50-60 cm. altus sursum plus minus recurvus supra sulcatus subglaber subsimplex. Folia opposita herbaceo-crassiuscula in exsiccato rigido-membranacea lineari-lanceolata maxima 11 cm. longa  $2\frac{1}{2}$  cm. lata apice acuminata basi subito cuneato-attenuata ad petiolum abeuntia margine subintegra remotissime mucronibus instructa trinervia, nervis lateralibus cum margine parallelis ab ea 2 mm. distantibus sursum prope apicem ad marginem attingentibus vel prope marginem evanescentibus, venis utroque latere costae numerosis transverse dispositis cum venulis transverse reticulatis, nervis lateralibus basi gradatim convergentibus cum costa ad petiolum abeuntibus, utraque pagina cystolithis verniformibus  $\frac{1}{5}$ - $\frac{1}{10}$  mm. longis regulariter conspersa; nervis supra haud elevatis haud impressis subtus planis; costa centrali 1 mm. lata subtus cystolithis  $\frac{1}{10}$ - $\frac{1}{5}$  mm. longis longitudinaliter conspersa; petiolis  $1\frac{1}{2}$ -2 cm. longis supra sulcatis, stipulis intra-axillaribus singulis cuspidiformibus castaneis membranaceis  $1\frac{1}{2}$  mm. longis 2 mm. latis apice acutis. Flores diceii. Fl.  $\frac{2}{1}$  cymosi, cymis axillaribus pedunculatis cum pedunculis 4 cm. longis, pedunculis 2 cm. glabris bracteis minutis. Perianthium fructiferum 3-partitum, segmentis inaequalibus, duobus minoribus triangulari-rotundatis 1 mm. longis apiculatis valde concavis margine integris glabris, uno majore  $1\frac{1}{3}$  mm. longo dorso carinato. Rudimenta staminum 3 segmentis perianthii opposita glabra 1 mm. longa crassiuscula  $\Omega$ -forme recurvata. Achaenium rotundato-ovatum  $1\frac{1}{2}$  mm. longum  $1\frac{1}{4}$  mm. latum complanatum biconvexum apice obtusum basi oblique contractum apice infra apicem latere stigmatiferum, stigmate brevissime pectinato, pericarpio crustaceo-coriaceo castaneo minute rubro-punctato. Semina ovata apice acuminata basi truncato-rotundata  $1\frac{1}{4}$  mm. longa  $\frac{1}{2}$ - $\frac{2}{3}$  mm. lata glabra, testa membranacea; albumen paucum; embryo circ.  $\frac{4}{5}$  mm. longus; radicula conica supra  $\frac{1}{4}$  mm.

longa; cotyledonibus late rotundatis  $\frac{2}{3}$  mm. latis totiusque longis.

HAB. KUSUKUSU, Jan. 1912, (fructus).

Near *P. smilacifolia* WEDD., (Hook. f. Fl. Brit. Ind. V. p. 553).

***Pilea taitoensis*** HAYATA sp. nov. Herba subsucculenta 30–60 cm. longa; caulis erectus haud ramosus sursum approximativè foliatus glaber. Folia opposita ovato-lanceolata vel oblongo-ovata interdum valde obliqua rarius aequalia 10–15 cm. longa 4–6 cm. lata apice subito acuminata caudato-acuminata (acuminibus 2 cm. longis ad summum obtusis falcato-recurvis vel rectis) basi rotundata obtusa vel cuneato-obtusa sed ad extremitatem basis semper minute cordata J-formia obliqua vel aequalia margine integra tenuiter cartilagineo-marginata vel grosse undulata 3-nervia, nervis lateralibus cum margine parallelis prope basium acuminis evanescentibus a margine 6 mm–1 cm. distantibus, venulis transverse dispositis grosse reticulatis, pagine supra cystolithis minutis circ.  $\frac{1}{3}$  mm. longis verniformibus (nervis venis venulisque exceptis) conspersa, subtus glabra sed ad nervos cystolithis longitudinaliter dispositis conspersa, petiolis cystolithis longitudinaliter dispositis conspersis  $\frac{1}{2}$ – $\frac{1}{4}$ -plo laminam foliorum æquantibus, stipulis axillaribus triangularibus brevioribus. Flores dioeci. Flores ♂ cymosi, cymis panicleiformibus ad axillas foliorum superiorum dispositis cum pedunculis 5–13 cm. longis gracilibus glabris laxè ramosis ad nodos bracteatis, (bracteis minutis late triangularibus  $\frac{1}{5}$  mm. longis  $\frac{2}{3}$  mm. latis), pedunculis 3–7 cm. longis rectis erectis; flores ad nodos glomerativè dispositi brevissime pedicellati glabri, pedicellis circ.  $\frac{3}{8}$  mm. longis glabris apice leviter dilatatis flavis cum flore articlatis. Perianthium glabrum 4-lobatum, tubo obconico  $\frac{3}{4}$  mm. longo totiusque lato, lobis oblongo-linearibus  $1\frac{1}{3}$  mm. longis  $\frac{2}{3}$  mm. latis apice obtusissimis apice rotundatis vel obtusissimis dorso infra apicem plus minus callosis. Stamina 4, ad basin loborum sita, filamentis glabris complanatis linearibus cum lobo æquilongis  $\frac{3}{8}$  mm. latis membranaceis multo fusco-rubro-striatis, antheris J-formibus, loculis basi divaricatis, dorso infra apicem glandula singula instructis.

HAB. TAITO: HAROYE, leg. Z. KOBAYASHI, Oct. 1907, (No. 6008), fl. ♂, typus.

Somewhat comparable with an Indian *P. lancifolia* Hook. f. (Fl. Brit. Ind. V. p. 553), but widely different from it in having quite entire and fleshy

leaves. Also near *P. kankaensis* HAYATA, but distinguishable from it by the much larger oblique leaves and by the much longer and spreading panicles with pedicellate flowers. The cystoliths on the surface of the leaves of *P. taitensis* are much shorter than those of *P. kankaensis*.

*Lecanthus* WEDD.

**Lecanthus Sasakii** HAYATA sp. nov. Herba subsucculenta glabra ramosa. Caulis glaber 30–40 cm. longus foliosissimus ramosus basi plus minus repens ad nodos radicans, ramis et ramulis gracilibus tenuibus repentibus ad nodos radicantibus. Folia opposita longe petiolata membranacea oblongo-obovata maxima 11 cm. longa minima 4 cm. longa 22 mm. lata apice caudata (caudis linearibus 8 mm. longis 2–3 mm. latis apice acuminatis) basi cordata rotundata truncata vel triangulari-acuta margine prope basin et in cauda integra æternum argute serrata, (serris mediis ascendentibus rotundatis triangularibus 3 mm. latis 2 mm. longis ab apice usque ad apicem 4 mm. distantibus apice breve cuspidatis sed haud aristatis) margine tota sub lente minute brevissime ciliolata trinervia, nervis lateralibus extrorsum venuliferis, venulis arcuatis ad apicem serrarum attingentibus, pilis rigidis calcaris  $\frac{4}{5}$  mm. longis  $\frac{4}{5}$  mm. latis 3-cellularibus liberis prope marginem ad paginam superiorem sparsissime dispositis, pagina supra pilis  $\frac{1}{5}$  mm. longis densiuscule conspersa, subtus nervis venis exceptis glabra, nervis et venis pilis liberis conspersis, petiolis laminam foliorum in longitudine  $\frac{1}{6}$ -plo æquantibus intus sursum plus minus sulcatis glabris, stipulis scariosis tenuissimis membranaceis subhyalinis axillaribus triangulari-ovatis 4 mm. longis  $2\frac{1}{2}$  mm. latis apice obtusis basi caulem semi-amplectantibus intus glabris margine ciliatis extus pilis liberis conspersis. Flores ♀ capiculati, capitulis solitariter axillaribus subpeltiformibus 1– $\frac{1}{2}$  cm. in diametro pedunculatis (pedunculis circ. 1 cm. longis glabris) bracteis 1–2-seriatim dispositis involucreatis; involucri bractee late triangulares glabræ apice acutæ versus apicem rubro-punctatæ; bracteolæ vel paleæ ad receptaculum minutæ lanceolatæ vel lineares 1 mm. longæ  $\frac{1}{5}$  mm. latæ glabræ acuminatissimæ; flores sessiles vel pedicellati, (pedicellis 1–2 mm. longis crassis glabris). Perianthii fructiferi segmenta 4 linearia  $1\frac{1}{2}$  mm. longa  $\frac{1}{2}$  mm. lata apice obtusa basi haud contracta utraq;e glabra dorso infra apicem brevissime cornuta, cornibus callosiformibus obtusissimis. Staminodia in flore fructifero 3 hyalina



crassissima linearia  $1\frac{1}{3}$  mm. longa  $\frac{1}{2}$  mm. lata cum segmentis opposita apice triangulari obtusa  $\Omega$ -formiter recurvata glaberrima. Achenium fusco-rubescens ovoideum vel ellipsoideum 1 mm. longum  $\frac{1}{2}$ - $\frac{2}{3}$  mm. latum glabrum læve vel minuto obscureque muricatum utrinque obtusum apice stigmatē minuto coronatum basi stipite  $\frac{1}{10}$  mm. longo stipitatum. Seminis testa fusco-rubescens membranacea elegante minuteque tuberculato-punctata; albumen paucum; embryo amplius ovoideus plus minus complanatus; radícula obconica cotyledones in longitudine  $\frac{3}{4}$ -plo æquans apice obtusa basi ad cotyledones abeuns laud contracta. *Lecanthus Wightii* HAYATA Fl. Mont. Formos. p. 197, (non WEDD.).

HAB. in monte Arisan, Jan. 1912, leg. B. HAYATA et S. SASAKI.

Near *Lecanthus Wightii* WEDD., but distinguishable from it by the shortly tailed leaves.

### *Pellionia* GAUDICH.

***Pellionia arisanensis*** HAYATA sp. nov. (Fig. 6.) Caulis basi procumbens ad nodos radicans tetragonus sursum ascendens densissime brevissime hirsutus sursum foliatus. Folia alterna oblique ovato-oblonga vel oblonga circ. 3 cm. longa 1 cm. lata apice caudato-acuminata ad summum obtuso-acuta basi valde obliqua latere superiore obtusa fracta latere inferiore minute cordata vel rotundata vel subauriculata margine basi apice exceptis acute serrata, serris ascendentibus acutis utroque latere 4-5 a se remotis, pagine utraque subglabra; petiolis 3 mm. longis, stipulis singulis extra-axillaribus setiformibus latere superiore caulis sitis. Flores monœcii vel diœcii; flores masculini cymosi, cymis ad folia superiora solitariter axillaribus cum pedunculis  $1\frac{1}{2}$ -2 cm. longis 1-2 cm. latis (pedunculis circ. 1 cm. longis basi bracteis minutis 2-3 instructis apice dense floriferis) sub lente minute hirsutis versus apicem ramosissimis, ramis hirsutis, pedicellis ultimis glabris 1- $1\frac{1}{2}$  mm. longis basi bracteis singulis instructis, bracteis lineari-lanceolatis 3 mm. longis  $\frac{3}{4}$  mm. latis apice acutis utraque pagine glabris basi laud contractis dorso infra apicem cornu singulo instructis, cornibus latere complanatis  $\frac{1}{3}$  mm. longis triangularibus dorso plus minus carinatis; pedicellis persistentibus apice cum flore caducissimo articulatis. Alabastrum floris subglobosum versus apicem 5-cornutum glabrum. Fl. ♂: perianthium floris apertientis 5-fidum 4 mm. in diametro pallidum extus viridescens intus album, tubo brevi 1 mm. in diametro, lobis patentissimis



5, 3 interioribus latioribus oblongis  $2\frac{1}{2}$  mm. longis  $1\frac{1}{2}$  vel  $1\frac{3}{4}$  mm. latis apice obtusissimis vel truncatis vel acutis basi haud contractis margine erosio concavis dorso medio tenuiter carinatis infra apicem supra medium dorso 1-cornutis, cornibus 1 mm. longis latere complanatis deorsum recurvis unciiformibus, lobis 2 exterioribus angustioribus spathulato-linearibus 2 mm. longis 1 mm. latis apice truncatis vel obtusissimis vel acutis infra apicem 1-cornutis. Stamina 5 lobis perianthii opposita, filamentis basi loborum affixis liberis glabris et iis æquilongis, antheris

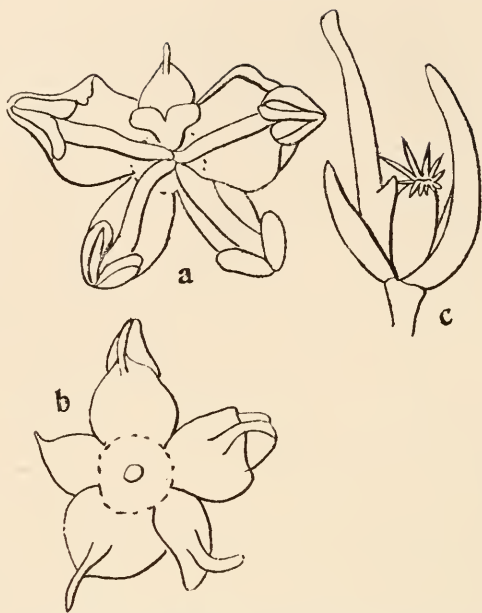


Fig. 6, *Pellionia arisanensis* HAYATA; a, a male flower; b, the same, seen from back; c, a female flower.

♂-formibus albis, loculis oblongo-linearibus 1 mm. longis apice se contactis basi in angulo  $30^{\circ}$ — $45^{\circ}$  divaricatis. Rudimentum ovarii nullum. Flores feminei densissime cymosi; cymæ subcapituliformes patelliformes bracteis linearibus oblongis 1–2 mm. longis  $\frac{1}{3}$ –1 mm. latis multis involucente circ. 5 mm. in diametro ∞-floratæ subsessiles vel brevissime pedunculatæ (pedunculis 1 mm. longis brevissime hirsutis); cymis ramosissimis, ramis brevissimis, pedicellis ultimis  $\frac{1}{2}$  mm. longis vel nullis glabris. Perianthium 4–5-fidum, segmentis 2-exterioribus minoribus 3-interioribus majoribus totis erectis apertientibus, exterioribus linearibus  $\frac{1}{2}$  mm. longis  $\frac{1}{3}$  mm. latis apice acutis vel obtusis concavis erectis rectis glabris dorso haud carinatis, interioribus 2–3 plus minus longioribus linearibus apice acutis vel obtusis valde concavis dorso infra apicem longissime cornutis, cornibus circ. 1 mm. longis teretibus viridibus. Rudimenta staminum 5 minutissima pulviniformia. Ovarium ellipsoideum  $\frac{1}{3}$  mm. longum glabrum utrinque obtusum, stigmate sessili pectinato-penicillato. Fructus ignotus.

HAB. Mt. Arisan, leg. B. HAYATA, inter Heishaua et Nimandaira, Mart. 1914.

Near *Pellionia radicans* WEDD.; but distinguishable from it in the much narrower leaves.

**Pellionia okinawensis** HAYATA sp. nov. Herba basi procumbens ad nodos radicans, radicibus fibrosis filiformibus, sursum ascendens. Caulis circ. 20 cm. longus haud ramosus vel rarius pauci-ramosus dense brevissimeque hirsutus (pilis retrorse recurvis brevissimis  $\frac{1}{2}$ – $\frac{2}{5}$  mm. longis) sursum foliatus. Folia alterna brevissime petiolata dorsiventraliter disposita ovata vel oblongo-ovata  $2\frac{1}{2}$ – $3\frac{1}{2}$  cm. longa 13–16 mm. lata apice recto-elongato-triangularia ad summum obtusissima basi valde obliqua latere inferiore valde rotundata vel anguste cordata auriculiformia latere superiore recto-cuneata ad extremitatem basis obtusa margine haud ciliolata grosse serrata, (serris subereniformibus ascendentibus obscure aristatis a sinibus mediis ad sinus proximos 6 mm. longis), haud trinervia, venis primariis lateralibus utroque latere costæ 3–4 basi rectis medio subito arcuatis eum iis superioribus junctis, venulis prope apicem serrarum evanescentibus haud attingentibus, costis venis venulisque supra haud elevatis haud impressis subtus leviter elevatis, pagina supra subglabra, subtus venis venulis sparse hirsutis exceptis glabra, petiolis 2–3 mm. longis minutissime hirsutis, stipulis extra-axillaribus singulis linearibus  $1\frac{1}{2}$  mm. longis acuminatis crassiusculis facie dorsali caulis sitis. Flores dense cymose dispositi; cymæ densissime floriferae subcapituliformes sed haud involueratæ in ambitu rotundatæ 5–6 mm. in diametro solitariae pedunculatæ, (pedunculis 5 mm.–10 mm. longis dense brevissime pilosis, pilis  $\frac{1}{2}$ – $\frac{1}{5}$  mm. longis descendento-patentibus); floribus pedicellatis, pedicellis  $\frac{1}{2}$  mm. longis glabris basi bracteatis et bracteolatis, bracteis linearibus 3 mm. longis acutis intus glabris extus paucissime hirsutis, bracteolis angustissimis. Perianthii fructiferi segmenta 5, angustissime linearia erecta, 2–exterioribus minoribus, 3–interioribus majoribus; exterioribus  $1$ – $1\frac{1}{3}$  mm. longis apice acuminatis  $\frac{1}{6}$  mm. latis glabris dorso haud cornutis margine minute remoteque glanduloso-ciliolatis; interioribus dorso infra apicem longe cornutis, cornibus teretibus linearibus 1 mm. longis  $\frac{1}{10}$  mm. latis. Rudimenta staminum 5 minuta inconspicua linearia  $\frac{1}{3}$  mm. longa  $\Lambda$ -forme recurva. Achænium ellipsoideum  $1\frac{1}{3}$  mm. longum  $\frac{3}{4}$  mm. latum apice obtusissimum basi subito acutum brevissime stipitatum prominente botrioideo-tuberculatum, (tuberculis apice rubro-maculatis  $\frac{2}{3}$  mm. longis totius-

que latis latere complanatis); testa seminis membranacea fusco-rubescens; albumen paucum; embryo amplius dorso complanatus; radicula obconica ad cotyledones abeuns.

HAB. Okinawa, leg. Y. TASHIRO, Mart. 1889.

Near *P. arisanensis* HAYATA, but distinguishable from it by the not caudate leaves, and by the pedunculate female inflorescence.

**Pellionia trilobulata** HAYATA Mater. Fl. Formos. p. 280. Descriptio aucta:—Flores dicecii. Fl. ♂: dense cymosi; cymæ subcapiculiformes bracteis involucreatæ pedunculatæ axillares solitariae, pedunculis 6 mm. longis glabris erectis; bracteis inferioribus oppositis ovatis 3 mm. longis apice obtusis intus glabris extus hirsutis dorso carinatis (carinis sub apice ad cornu productis, cornibus  $\frac{1}{3}$  mm. longis obtusis) basi cum iis oppositis connatis margine ciliatis. Flores apertientes pedicillati, pedicellis  $1\frac{1}{2}$  mm. longis apice cum flore articulatis. Perianthium: tubo breve obconico  $\frac{1}{2}$  mm. longo  $1\frac{1}{2}$  mm. in diametro, limbo 4-partito, partibus 2 exterioribus leviter minoribus oblongis 2 mm. longis  $1\frac{1}{2}$  mm. latis apice obtusis basi contractis margine integris valde concavis dorso carinatis sub apice cornutis, cornibus circ. 1 mm. longis erectis vel interiore uncinato-recurvis, extus sparse hirsutis, partibus 2 interioribus leviter majoribus cum exterioribus conformibus sed margine sub microscopio minute crosis dorso carinatis cornutis. Stamina 4 segmentis perianthii opposita, filamentis basi segmentorum oriundis ad 1 mm. cum segmentis connatis caeterum liberis linearibus vittæformibus 2 mm. longis  $\frac{1}{2}$  mm. latis valde complanatis glabris, antheris 2-locularibus, loculis linearibus 1 mm. longis  $\frac{1}{4}$  mm. latis apice contactis caeterum separatis divergentibus interiore alatis. Rudimentum ovarii nullum.

HAB. inter Heishana et Nimandaira, leg. B. HAYATA, April. 1914, (fl. ♂).

**Pellionia Tashiroi** HAYATA sp. nov. Herba humilis basi procumbens ad nodos radicefera sursum ascendens, partibus ascendentibus 6–7 cm. longis. Caulis pauci-ramosus densissime brevissimeque hirsutus sursum foliatus. Folia alterna ovato-oblonga vel oblonga  $1\frac{1}{2}$  cm. longa 1 cm. lata apice obtusa basi valde obliqua latere superiore obtusa plus minus fracta latere inferiore minute cordata vel rotundata, in latere inferiore latiora quam in latere superiore, pagina

supra subglabra pilis calcareis circ.  $\frac{2}{3}$  mm. longis sparsissime conspersa subtus venis nervis sparse hirsutis exceptis glabra margine crenato-serrata, serris ascendentibus utroque latere 4-5 obtusissimis haud ciliatis, petiolis 1-2 mm. longis, stipulis singulis extra-axillaribus linearibus 1 mm. longis setiformibus glabris latere superiore caulis sitis. Flores dioecii. Flores feminei ad axillas dense fasciculati, fasciculis capituliformibus subsessilibus vel brevissime pedunculatis (pedunculis  $\frac{1}{4}$  mm. longis) 2 mm. in diametro bracteis multis involu- cratis; bracteis lanceolatis 1 mm. longis  $\frac{1}{2}$  mm. latis acuminatis intus glabris basi plus minus contractis extus glabris patentibus; bracteis inter flores cum iis involucri æquiformibus; bracteolis floris minoribus; flores brevissime pedicellati vel sessiles. Segmenta perianthii 5, 3-majoribus, 2-minoribus; minoribus  $\frac{1}{2}$  mm. longis linearibus haud cornutis; majoribus dorso infra apicem cornutis cum cornibus  $\frac{2}{3}$  mm. longis. Ovarium minutissimum, stigmate termi- nali pectinato-penicillato.

HAB. Loochoo, leg. Y. TASHIRO, Mart. 1887.

Remarkable for the smaller heads of the female flowers.

*Elatostema* FORST.

***Elatostema herbaceifolia*** HAYATA sp. nov. Herba tenuis gracilis 50-60 cm. longa. Caulis gracillimus scandens glaber sursum remote foliatus. Folia alterna remote disposita tenuiter membranacea obovato-lanceolata vel ovato-lanceolata maxima 14 cm. longa 4 cm. lata apice caudato-acuminata, (acuminibus linearibus  $3\frac{1}{2}$  cm. longis medio 4 mm. latis integris) basi obliqua obtusa latere superiore recto-angusto-connata, latere inferiore rotundata vel obtusa, latere superiore medio 16 mm. lato, latere inferiore medio 24 mm. lato, margine basi acumineque excepto grosse serrata (serris late triangulari-acutis apice subobtusis breve cuspidiformibus 9 mm. latis  $2\frac{1}{2}$  mm. longis ascendentibus) venis nervisque tenuissimis, pagine supra pilis liberis  $\frac{2}{3}$  mm. longis sparsissime cystolithis  $\frac{1}{6}$  mm. longis vermiformibus toto regulariter conspersa, pagina subtus haud lepidota sed cystolithis vermiformibus conspersa, pilis liberis nullis, petiolis brevissimis 2 mm. longis, stipulis caducissimis lanceolatis mem- branaceis 4 mm. longis acutis gemmam involventibus demum deciduis. Flores dioecii. Fl. ♀: dense capitulati, capitulis axillaribus solitariis peltiformibus densissime brevissime villosis pedunculatis, pedunculis 2 mm. longis, receptaculis



capituli peltiformibus rotundatis 7–8 mm. in diametro supra leviter convexis subtus leviter concavis margine bracteis exterioribus 5 majoribus linearibus 2 mm. longis et interioribus linearibus minoribus  $\frac{1}{2}$  mm. longis multis involucratissimis; paleae inter flores densissime dispositae lineari-spathulatae  $\frac{1}{2}$ – $\frac{1}{3}$  mm. longae  $\frac{1}{8}$ – $\frac{1}{6}$  mm. latae apice truncatae et dense piloso-setulosae; flores brevissime pedicellati, pedicellis  $\frac{1}{10}$  mm. longis glabris; perianthium fl. ♀ minutum  $\frac{1}{20}$  mm. longum  $\frac{1}{10}$  mm. latum 3–4-lobatum, lobis linearibus. Ovarium ovoideum  $\frac{1}{8}$  mm. longum, stigmate sessile pectinato.

HAB. Formosa, loco non indicato: Description above given is drawn from premature flowers. It is desirable to repeat the description when perfect materials are collected. Near *Elatostema lineolatum* WIGHT, but distinguishable from it in having much thinner leaves and quite glabrous branches.

**Elatostema lineolatum** WIGHT var. **major** THW.; MATSUM. et HAYATA Enum. Pl. Formos. p. 384. Herbaceo-suffrutescens 60 cm. altus, ramis et ramulis teretibus fuscentibus densissime brevissime hirsutis (pilis transverse patentibus vel descendentes) sursum foliatis. Folia alterna obovato-lanceolata vel oblanceolata membranacea sessilia vel brevissime petiolata 6–10 cm. longa 2–3 cm. lata apice caudato-acuminata (acuminibus 1–2½ cm. longis basi 4 mm. latis ad summum aristato-acuminatis) basi plus minus obliqua recto-cuneato-acuminata ad extremitatem obtusa margine medio deorsum integra medio sursum grosse serrata, (serris latere superiore 2–3 latere inferiore 5, triangulari-acutis apice brevis cuspidatis), venis lateralibus primariis utroque latere costae 4–5 a costa angulo acuto egressis, costis venisque supra planis subtus elevatis, paginae supra pilis liberis  $\frac{2}{3}$  mm. longis et cystolithis brevissimis  $\frac{1}{5}$  mm. longis vermiformibus conspersa, pagina subtus ad venas nervosque pilis liberis hirsuta, petiolis brevissimis 2 mm. longis adpresse hirsutis vel subnullis, stipulis linearibus 7 mm. longis singulis 1 mm. latis apice acuminatis aristatis hirsutis castaneis membranaceis extra-axillaribus latere superiore caulis sitis. Flores dioecii. Fl. ♀: ad axillas foliorum fasciculati; fasciculi solitarii basi bracteis castaneis 3–4 lanceolatis 1–2 mm. longis medio carinatis acuminatis margine ciliatis instructi capituliformes peltiformes 6 mm. in diametro bracteis 4–5 exterioribus majoribus involucratissimis, bracteis involucralibus majoribus plus minus connatis late ovatis 2 mm. latis totiusque longis apice obtusis vel acutis



dorso extus dense hirsutis intus glaberrimis, interioribus minoribus; bracteae inter flores (vel paleae) in forma variabilissimae lineares obovatae vel oblongae vel spathulatae intus glabrae extus apice dense pilosae circ. 2 mm. longae; pedicellis 2 mm. longis apice cum flore articulatis glabris. Perianthium 4-lobatum, tubo brevissimo, lobis lineari-oblongis  $1\frac{1}{2}$  mm. longis  $1\frac{1}{2}$  mm. latis apice obtusis extus dorso sub apicem breve cornutis basi haud contractis intus glabris extus versus apicem longe pilosis. Stamina 4 cum lobis perianthii opposita, filamentis a basi loborum liberis 2 mm. longis. Rudimentum ovarii glabrum minutum vel subnullum.

HAB. Mt. Arisan, leg. B. HAYATA, Jan. 1912.

**Elatostema microcephalantha** HAYATA sp. nov. Herba. Caulis basi repens radicans sursum ascendens 10–20 cm. longus breve hirsutus (pilis adpresso-ascendentibus circ.  $\frac{1}{6}$  mm. longis), sursum foliatus, partibus caulibus foliiferis plus minus flexuosis. Folia alterna herbaceo-membranacea a se  $\frac{1}{2}$ –1 cm. remota ovata valde obliqua 2 cm. longa 13–14 mm. lata apice obtusa basi valde obliqua latere superiore cuneato-obtusa in latere inferiore rotundata vel rotundato-cordata medio latere superiore 5 mm. lata in latere inferiore 8 mm. lata margine partibus basilaribus exceptis grosse serrata, serris ascendentibus apice rotundatis vel obtusissimis mediis a se (ab sinu ad sinus) 5 mm. distantibus basi 5 mm. latis 3 mm. longis, subtrinervia vel obscure trinervia, nervis cum venis grossissime reticulatis, nervis venisque supra valde impressis subtus elevatis, venis ad apicem serrarum attingentibus, pagina supra marginibus exceptis glabra, margine ciliolata, pagina subtus sparsissime hirsuta, petiolis brevissimis 1 mm. longis hirsutis supra sulcatis, stipulis dimorphis, alteris extra-petiole linearibus apice acutis  $1\frac{1}{3}$  mm. longis  $\frac{1}{3}$  mm. latis crassiusculis extus hirsutis intus glabris, alteris intra-petiole triangulari-oblongis  $\frac{2}{3}$  mm. longis  $\frac{1}{2}$  mm. latis acutis membranaceis subglabris. Flores ♀ capitulati, capitulis solitariis axillaribus peltiformibus 3–4 mm. in diametro pedunculatis, pedunculis 2–3 mm. longis glabris. Involucrum subpeltiforme margine bracteis circ. 3-seriatim dispositis involucreto, bracteis exterioribus 5 latioribus oblongo-triangularibus acutis vel obtusis 1 mm. longis margine setulosis utraque paginae glabris, interioribus gradatim angustioribus, intimis linearibus apice margineque setulosis, bracteolis vel paleis inter flores sitis spathulatis circ. 1 mm. longis  $\frac{1}{3}$  mm. latis

apice obtusis margine apiceque setulosis intus glabris extus dorso versus apicem plus minus setulosis deorsum glabris interdum valde angustatis lineari-filiformibus. Capitula unisexualia; receptaculum subplanum glabrum; flores pedicellati, pedicellis glabris  $\frac{1}{2}$  mm. longis  $\frac{1}{4}$  mm. crassis crassiusculis. Fl. ♀ minutissimi  $\frac{1}{2}$  mm. in diametro: segmenta 3 triangularia vel linearia circ.  $\frac{1}{5}$  mm. longa versus apicem rubro-punctata; staminodia 3 segmentis perianthii opposita  $\frac{1}{2}$ – $\frac{1}{3}$  mm. longa  $\frac{1}{4}$ – $\frac{1}{5}$  mm. lata linearia verniformia  $\Omega$ -forme recurva infra achenium insita. Achenium ovoideo-ellipsoideum  $\frac{3}{8}$  mm. longum  $\frac{2}{5}$  mm. latum apice obtusum ad summum stigmatē penicillato minuto coronatum basi acutum stipite minute  $\frac{1}{5}$  mm. longo obconico stipitatum subleve vel minute tuberculatum haud echinatum haud muricatum. Semina ovoideo-ellipsoidea; testa membranacea; albumen nullum; embryo amplus haud vel vix complanatus elliptico-obovoidens; radicula supra coniformi basi gradatim ad cotyledones abeunt cotyledones in longitudine  $\frac{3}{4}$ -plo æquans; cotyledones crassæ oblongæ.

HAB. Mt. Arisan, leg. B. HAYATA, Jan. 1912. From the position of the seed and embryo, it is justly considered that the ovules are erect and orthotropous. Near *Elatostema sessile*, but differs from it by the smaller leaves.

**Elatostema minutum** HAYATA (Fig. 7) Fl. Mont. Formos. p. 198 t. 36. Descriptio aucta:—Fl. ♂: cymosi, cymis axillaribus solitariis glabris capituliformibus breve pedunculatis, pedunculis 1 mm. longis basi minute bracteatis; cymis 6-floratis rarius 10-floratis bracteis et bracteolis involucretis, bracteis ordinis I. late rotundatis 2 mm. longis totiusque latis apice rotundatis infra apicem dorso brevissime cornuto-apiculatis margine minute ciliolatis utraque pagine glabris valde concavis; bracteis ordinis II. oblongo-naviculiformibus 2 mm. longis explicato totiusque latis apice 2-lobatis vel rotundatis dorso apice hirsutis margine apice ciliolatis deorsum haud ciliolatis intus glaberrimis, bracteis ordinis III. (vel bracteolis) obovato-cuneatis 2 mm. longis 1 mm. latis apice rotundatis latissimis leviter 2-lobatis apice margine ciliolatis cæterum haud ciliolatis; pedicellis florum  $1\frac{1}{2}$  mm. longis glabris haud bracteatis. Perianthii lobi 5, lobis obovato-

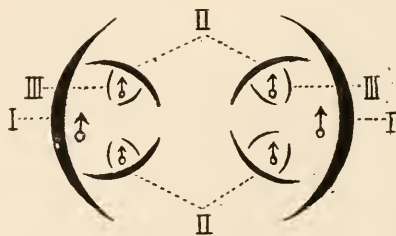


Fig. 7, *Elatostema minutum* HAYATA; a diagram of a male inflorescence.

linearibus 1 mm. longis  $\frac{2}{3}$  mm. latis apice rotundatis ciliatis vel haud ciliatis intus concavis vel haud concavis dorso infra apicem cornutis vel haud cornutis. Stamina 5 cum lobis perianthii opposita, filamentis linearibus  $1\frac{1}{2}$  mm. longis dorso complanatis, antheris ovato-oblongis  $\frac{1}{2}$  mm. longis. Rudimentum ovarii 0.

HAB. Arisan, 2500 m. alt., Juni. 1914, U. FAURIE, (No. 612).

*Chamabaina* WIGHT.

**Chamabaina Morii** HAYATA Mater. Fl. Formos. p. 282. Descriptio aucta: Flores dioecii. Fl. ♀: ad nodos ad axillas stipularum fasciculati brevissime pedicellati, pedicellis  $\frac{1}{2}$  mm. longis basi bracteatis, bracteis ovato-oblongis  $\frac{4}{5}$  mm. longis  $\frac{2}{3}$  mm. latis apice obtusis intus glabris extus hirsutis castaneis apice setulis 2-3 instructis membranaceis, bracteolis lanceolatis  $\frac{2}{3}$  mm. longis extus hirsutis. Perianthium obovoideo-urceolatum  $\frac{2}{3}$  mm. longum  $\frac{1}{2}$  mm. latum apice valde contractum brevissime rostratum ore 2-3-lobatum vel elobatum extus setuloso-hirsutum intus glabrum basi obtusum. Staminodia toto obsoleta. Ovarium ellipsoideum cum rostris  $\frac{4}{5}$  mm. longum  $\frac{1}{2}$  mm. latum, rostro (vel stylo)  $\frac{1}{5}$  mm. longo apice peltatum dilatato, pelta (vel stigmate) margine longe fimbriata. Achenium maturum perianthio complete obtectum oblongum biconvexum  $\frac{4}{5}$  mm. longum  $\frac{1}{2}$  mm. latum rubescens nitidum apice latere uno prominente latere uno minus carinatum apice breve stylo brevissimo apiculatum basi obtusum, pericarpio crustaceo. Seminis testa membranacea; albumen paucum; embryo  $\frac{2}{3}$  mm. longus; radicula oblongo-conica; cotyledonibus oblongis.

HAB. Mt. Haupōfukuzau, leg. T. SŌMA, Dec. 1914, fr.

Juglandaceæ.

*Engelhardtia* LESCH.

**Engelhardtia formosana** HAYATA n. n. *Engelhardtia spicata* BLUME var. *formosana* HAYATA Fl. Mont. Formos. p. 199. Descriptio aucta: Flores monoecii. Fl. ♂: spicato-paniculati, paniculis terminalibus pauci-ramosis, ramis simplicibus circ. 10 cm. longis gracillimis recurvo-cornutis spicatim florigeris, rhachibus dense lepidotis, lepidibus rotundatis  $\frac{2}{3}$  mm. in diametro medio rotundato-elevatis margine integris, pedicellis subnullis, bracteis nullis, floribus a se 2-3 mm. remotis. Perianthium 3-4-partitum, partibus apice margineque

valde concavo-recurvis sacciforme globosis  $1\frac{1}{2}$  mm. in diametro extus dense lepidotis intus glabris. Stamina 8–10, antheris sessilibus oblongo-globosis  $\frac{1}{2}$  mm. longis  $\frac{1}{3}$  mm. latis utrinque emarginatis glabris. Rudimentum ovarii nullum. Fl. ♀: paniculæ rami graciles basi ascendentes sursum subcernui bracteis nullis; flores pedicellati, pedicellis 2 mm. longis dense lepidotis transverse insitis, floribus ascendentis-erectis; bractea 3-fida crassiuscula extus dense lepidota margine et intus densissime tomentosa, segmento anteriore longissimo lineari  $1\frac{1}{2}$ –2 mm. longo  $\frac{1}{2}$  mm. lato, segmentis lateralibus brevioribus 1 mm. longis  $\frac{2}{3}$  mm. latis obtusis, totis intus densissime stellatis. Ovarium inferum  $1\frac{1}{2}$  mm. longum 1 mm. latum densissime lepidotum apice basique plus minus constrictum cum tubo perianthii connatum, lobis perianthii 4 linearibus crassiusculis  $1\frac{1}{2}$  mm. longis  $\frac{1}{2}$  mm. latis apice obtusis margine apiceque valde interiore recurvis sacciformibus extus sparse lepidotis. Styli brevissimi  $\frac{1}{4}$  mm. longi 2-fidi, ramis divaricatis apice 2-lobis, lobis uncinato-recurvis stigmatosis; ovarium 2-loculare.

HAB. Uraisha, leg. S. SASAKI, Aug. 1910; ibidem, leg. B. HAYATA, Juli. 1912, fl. ♀ et ♂.

## Cupuliferæ.

### *Carpinus* LINN.

***Carpinus hogcensis*** HAYATA sp. nov. Arborescens; ramulis fusco-purpurascensibus lævibus gracillimis, lenticellis minutis sparsissimis vel nullis. Folia membranacea vel membranaceo-chartacea alterna ovato-lanceolata 8 cm. longa 27 mm. lata apice triangulari-acuminata vel gradatim acuminatissima basi leviter cordata supra basin latissima margine simpliciter vel duplicatim serrulata, serrulis ascendentibus late triangularibus latere interiore serrulis secundariis unis instructis apice rectis vel interiore recurvis, utraque pagine hirsuta sed ad costas et venas sparse hirsuta subtus ad axillas inter costam et venas pilis dense fasciculatis instructa, costis et venis supra haud vel vix elevatis, subtus distincte manifesteque elevatis, venis primariis lateralibus utroque latere costæ 15–17 rectis mediis a costa angulo  $45^\circ$  egressis usque ad apicem rectis prope apicem subito arcuatis ascendentibus ad apicem serrularum attingentibus, petiolis 17 mm. longis teretibus glabris vel sparse hirsutis haud sulcatis.

Spicæ fructiferae terminales cum pedunculis 5–10 cm. longis nutantes, pedunculis 2–3 cm. longis, fructibus oppositis, jugis 1 cm. remotis, bracteis cultriformibus vel semi-ovatis 10–13 mm. longis 4–5 mm. latis apice acutis obtusis basi obtusissimis vel rotundatis basin achæniî hand vel vix amplectantibus extus deorsum hirsutis intus subglabris margine latere interiore rectis integris, latere exteriori serratis curvis, latere interiore angustiore latere exteriori latiore costis et venis utraque pagine elevatis reticulatis, reticulis utraque pagine elevatis. Achænium leviter complanatum ovato-rotundatum 3 mm. longum totiusque latum apice obtusissimum basi truncato-rotundatum minute pubescens sursum versus apicem barbatum reliquis stylosum apice coronatum facie circ. 10-costatum.

HAB. Musha: Hôgô, ad 3500 ped. alt., leg.

B. HAYATA, Aprili. 1916.

Near *C. Kawakamii* HAYATA, but separable from it by the elongate ovate-oblong leaves which are always cordate at the base.

***Carpinus rankanensis*** HAYATA sp. nov.  
(Pl. X. et fig. 8.) Arbor. Ramuli fuscentes minute lenticellati, lenticellis fulvescentibus leviter elevatis verticaliter elongatis vel linearibus, ramulis ultimis levibus fulvescentibus glabris. Folia decidua alterna viridia membranaceo-chartacea ovato-oblonga 8–10 cm. longa 3–4 cm. lata apice subito acuminata vel caudata basi profunde cordata margine irregulariter serrulata, serrulis ascendentibus ad apicem aristis superiore recurvis instructis, costis venisque supra impressis subtus elevatis supra ad costam hirsuta cæterum glabra, subtus ad costam venasque pilosa, pilis adpressis rectis mollis cæterum glabra, venis lateralibus parallelis utroque latere costæ 20–25 a se 3–4 mm. distantibus rectis ad marginem attingentibus, petiolis 5–10 mm. longis glabris.

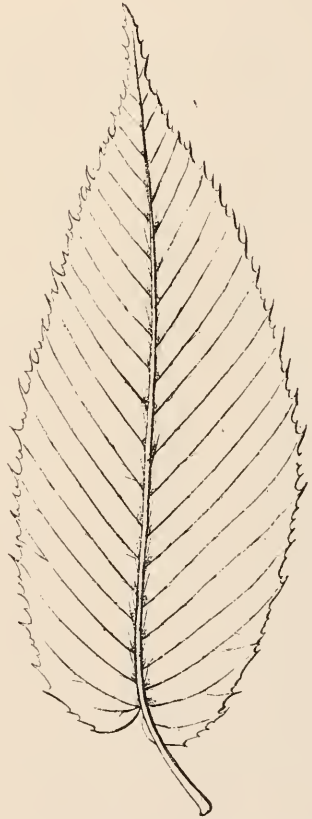


Fig. 8, *Carpinus rankanensis*  
HAYATA.



Amenta fructifera terminalia pendula cylindrico-linearia 10–12 cm. longa 2 cm. lata, pedunculis 2–3 cm. longis gracilibus deorsum recurvis hirsutis sursum bracteis 4–5 instructis; amenta longe cylindrica 10–12 cm. longa 18 mm. lata, bracteis fructiferis dense imbricatis plus minus oblique ovatis 13 mm. longis 7 mm. latis basi auriculato-plicatis achænium firme amplexantibus basi dense barbatis utraque pagine elevato-reticulatis utraque pagine hirsutis margine pauciserratis. Achænium prematurum 10-costatum glabrum apice barbatum stigmatibus linearibus 2 coronatum.

HAB. Rankanzan, ad 4000 ped. alt., leg. B. HAYATA, Mai. 1916.

Near *Carpinus japonica*, but differs from it in the much longer and narrower fruiting catkins.

### *Quercus* LINN.

***Quercus longicaudata*** HAYATA Ic. Pl. Formos. III. p. 182. Descriptio aucta: Fructus cum cupulis conico-pyramidalis 1 cm. longus 9 mm. latus apice conico-acutus basi subtruncatus stipitatus, stipitibus 3 mm. longis. Glans coniformis subtriangularis in sectione apice acuta basi truncata tenuiter hirsuta vel glabra castanea cupula complete inclusa, cupula coriaceo-crustacea sparse muricata.

HAB. Daibu, leg. S. NAKAI, Dec. 1912. (Fr.)

***Quercus Sasaki*** KANEHIRA sp. nov. Arbor; ramuli teretes fusco-purpurascens minute laxiusculeque lenticellati haud rugosi, lenticellis rotundatis elevatis. Folia coriacea oblongo-oblancoolata vel obovato-oblonga vel oblonga 7–11 cm. longa  $2\frac{1}{2}$ – $3\frac{1}{2}$  cm. lata apice acuminata vel cuspidato-acuminata basi truncata acuta vel obtusa margine a basi ad medium integra a medio sursum grosse serrata, serris ascendentibus apice plus minus interiore recurvis, supra nitida subtus glauca, costis venisque supra haud elevatis subtus elevatis, venis primariis lateralibus utroque latere costæ 9–11, mediis a costa angulo  $40^{\circ}$ – $45^{\circ}$  egressis rectis ad apicem serrarum attingentibus, petiolis 18–22 mm. longis semiteretibus glabris. Cupula depresso-semi-globosa 10–12 mm. alta 14 mm. in diametro extus fusco-glauca annulis notata, annulis circ. 10, intus fulvo-sericea. Glans semi-globosa valde depressa 8–9 mm. alta 16 mm. in diametro ad summum impressa ad centrum breve apiculata basi subplana, cicatricibus elevatis 9 mm. in diametro.

HAB. Kappanzan, leg. S. SASAKI, Nov. 1915. (Fr.)

Near *Q. glauca* TH. in the leaves, but distinguishable from it by the glands which are very much depressed at the top.

## Salicineæ.

### *Salix* LINN.

***Salix eriostroma*** HAYATA sp. nov. Frutex. Rami recti, cortice levi fulvescenti, brevissime hirsuti, ramulis foliiferis rectis gracilibus dense villosis. Folia chartacea oblongo-lanceolata 3-4 cm. longa 9-10 mm. lata margine integra utrinque acuta supra sparse subtus densissime sericeo-villosa, venis lateralibus primariis utroque latere costæ circ. 10 sursum arcuatis tenuissimis, petiolis 3 mm. longis villosis, stipulis minutissimis lanceolato-triangularibus  $\frac{1}{2}$  mm. longis. Amenta fructifera ad ramos annotinos lateraliter sita 6 cm. longa 8 mm. lata sessilia densissime fructifera, pedicellis pilosis 1 mm. longis, bracteis ellipticis 1 mm. longis extus pilosis apice truncatis intus glabris, fructibus 4 mm. longis glabris rubescentibus ad basin minute tenuiter hirsutis, rhachibus amenti dense pilosis.

HAB. Tonkurankei, leg. U. MORI, 1910, Aprili., (fr.)

Near *Salix transarisanensis* HAY., but distinguishable from it by the very much more villose bracts and by the leaves which are sericeously villose on the under surface.

***Salix suishænsis*** HAYATA sp. nov. Frutex 2-3 m. altus ramosus, ramulis gracilibus levibus sparsissime hirsutis. Folia chartacea oblonga obovata vel obovato-oblonga 8-9 cm. longa  $3\frac{1}{2}$  cm. lata apice cuspidato-acuminata vel acuminata basi obtuse cordata vel minute cordata margine minute serrulata basi glandulis 2 instructa supra subglabra subtus fulvo-hirsuta utraque distincte venosa, petiolis 12 mm. longis. Amentum florum ♂: lineari-cylindricum cernuum 6 cm. longum dense hirsutum deuse floriferum, bracteis obovatis  $2\frac{1}{2}$  mm. longis  $1\frac{1}{2}$  mm. latis apice rotundato-obtusis basi angustioribus utraque pagine hirsutis membranaceis, discis obtusis  $\frac{1}{2}$  mm. longis; staminibus 6, filamentis basi hirsutis sursum glabris, antheris reniforme-rotundatis 2-locularibus.

HAB. Snisha, secus stagnum, Aprili. 1916, leg. B. HAYATA.

Near *S. Warburgii* SEEM., but separable from it by the leaves which are hirsute beneath.

## Coniferæ.

*Podocarpus* L' HÉR.

**Podocarpus Nakaii** HAYATA sp. nov. Arbor. Ramuli teretes fusi glabri. Folia ad nodos approximatum et versus internodia remote alternatimque disposita lineari-lanceolata vel linearia 5-9 cm. longa 8 mm.-11 mm. lata recta vel leviter falcato-recurva apice obtusa basi acuta vel breve attenuata margine integerrima coriacea utraque glabra supra nitida subtus pallida haud glauca, costa supra acute elevata subtus leviter elevata subplana, petiolis brevissimis usque ad 5 mm. longis subulatis. Fructus ad axillas foliorum solitariter siti, pedicellis 2 mm. longis glabris erectis apice bracteis 2 instructis, bracteis triangularibus 1½ mm. longis 1 mm. latis apice cuspidato-acutis dorso carinatis crassiusculis. Receptaculum carnosum oblique obconico-globosum medio tenuiter 2-lobatum 4 mm. longum totiusque latum, lobis apice breve apiculatis. Bacca oblique globosa 1 cm. longa 8 mm. lata apice apiculato-acuta glabra.

HAB. Nantō: Holisha, Toshōkō, leg. S. NAKAI, Dec. 1915.

Near *P. macrophylla*, but distinguishable from it in having ovate berries which are acute at the apex.

## Orchideæ.

*Cypripedium* L'INN.

**Cypripedium formosanum** HAYATA sp. nov. (Fig. 9.) *Cypripedium japonicum* HAYATA Ic. Pl. Formos. II. p. 136, (non THUNB.) Rhizoma repens ramosum; canlis basi ascendens et erectus basi vaginis 1-8 cm. longis 5-8 instructus medio 2-foliatus apice flore singulo terminatus 2-25 cm. longus. Folia quasiopposita obovato-rotundata 10-13 cm. longa 7-9 cm. lata apice rotundata vel late triangulari-acuta ad summum aristis instructa basi cuneata membranacea duplicato-plicata supra glabra subtus minute sparsissime brevissime hirsuta margine minute ciliolata subintegra vel minute crosa palmatinervia, nervis 11-13 radiatim divaricatis apice vena marginali conjunctis, venulis inter nervos circ. 9, sessilia, vaginis cylindrico-tubulosis 7 cm. longis subglabris. Flores solitarii, pedunculis 11 cm. longis subglabris vel sparse hirsutis apice bracteis singulis instructis erectis rectis, bracteis ovato-lanceolatis

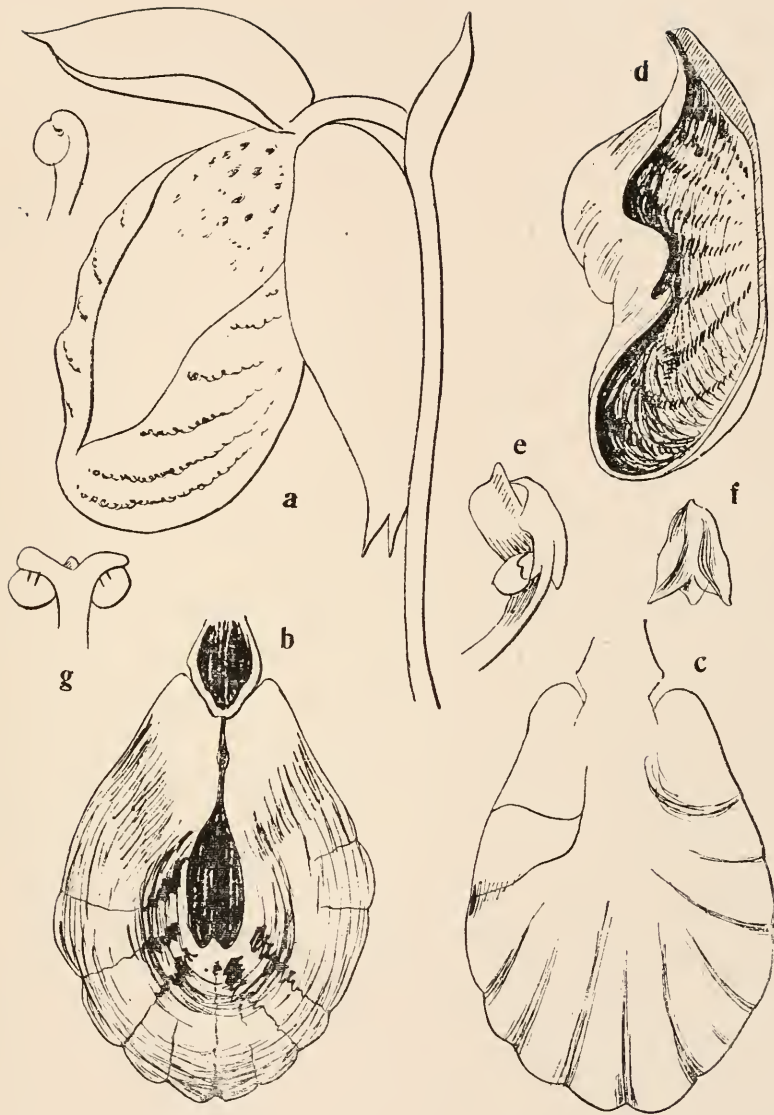


Fig. 9, *Cypripedium formosanum* HAYATA; a, a flower; b, a lip seen from above; c, the same, seen from below; d, the same, in section; e, Column; f, staminode, seen from face; g, a stamen; h, the same, seen from side.

22 mm. longis 10 mm. latis sparse hirsutis vel subglabris basin ovarii amplexantibus. Ovarium 18 mm. longum subfusiforme 2 mm. latum 18 mm. longum dense hirsutum. Flores in alabastro pallido-flavescentes per anthesin

leviter purpurascens. Sepalum posticum distinctum subalbum ovato-lanceolatum  $4\frac{1}{2}$  cm. longum 2 cm. latum apice acutum vel obtusum integrum utraque pagine glabrum sed ad marginem inferiorem ciliatum parallero-nervium, sepala lateralialia dua subalba se connata naviculiformia  $4\frac{1}{2}$  cm. longa  $2\frac{1}{2}$  cm. lata apice breve acuminata ad summum 2-apiculata basi leviter contracta intus glabra extus glabra margine inferiore ciliolata parallero-nervia. Petala plus minus obliqua ovato-lanceolata 5 cm. longa 18 mm. lata apice breve acuminata basi obtusa margine integra extus glabra intus deorsum hirsuto-barbata intus deorsum purpureo-maculata margine haud ciliolata. Labellum sessile patens inflato-calceoliforme  $5\frac{1}{2}$ – $6\frac{1}{2}$  cm. longum 4 cm. latum  $2\frac{1}{2}$  cm. altum, partibus basilaribus unguiculiformibus 1 cm. longis totiusque latis; lobi laterales ad basin calceoli subnulli; ore calceoli 17 mm. longo 7 mm. lato; calceolus intus prope fundum barbatus flavescens radiatim purpureo-maculatus. Columna brevis 1 cm. longa teres 2 mm. in diametro; antheræ perfectæ 2 ad latera rostellii fere sessiles 4 mm. longæque late subglobose, loculis parallelis contiguïs; staminodium pone rostellum incumbens late laminiforme leviter purpurascens late sagittiforme 1 cm. longum 7 mm. latum apice breve cuspidatum basi sagittatum, facie loculos 2 imperfectos ferens. Rostellum inter antheras perfectas antrorsum inflexum crassiusculum obtriangulare 6 mm. latum 7 mm. longum margine utroque latere lobulis singulis brevissimis instructum, subtus papilloso-stigmatosum. Capsula ignota.

HAB. Oiwake, ad 7500 ped. alt., leg. B. HAYATA, Aprili. 1916.

Differs from *C. japonicum* in the nearly glabrous peduncles and less hairy ovaries, in the maculation of light purple dots, which dots in the Japanese species are nearly colorless and translucent. In the living specimens, the Japanese and Formosan plants are easily distinguishable; the flowers of the former are more or less brownish, while those of the latter are whitish. In the Japanese species the leaves are nearly quite expanded when flowering, but in the Formosan, they are partly folded, but not quite expanded.

***Microstylis* NUTT.**

***Microstylis arisanensis* HAYATA** sp. nov. (Pl. XI. et fig. 10). Terrestis? Radices e basi pseudobulbi oriundæ incrassatæ numerosæ. Pseudobulbi annotini ellipsoidei 7 mm. longi 5 mm. lati apice rotundati plus minus



complanati subnudi; hornotini minores 3-4 mm. longi totiusque lati apice caulem singulum emittentes. Caulis simplex subtereto-complanatus anguste alatus cum racemo 7-15 cm. longus medio cum alis circ. 1 mm. latus basi cum pseudobulbo squamis scariosis 2-3 involutus glaber, squamis superioribus vaginiformibus tubiformibus, tubis  $1\frac{1}{2}$  num. longis 4 mm. latis apice obtusis, basi folio singulo instructus rarius 2-foliatus, tunc altro majore altro multo minore. Folia generaliter solitaria petiolata, lamina oblango-ovata  $5\frac{1}{2}$  cm. longa 3 cm. lata apice obtusissima basi obtusa membranacea utraque glabra margine integerrima basi ad petiolum gradatim abeunti, petiolis medio deorsum vaginiformibus cum vaginis  $2\frac{1}{3}$  mm. longis membranaceis plicatis. Pars florifera racemi 2-8 cm. longa laxiuscule florifera, bracteis lanceolatis 2-3 mm. longis apice acuminatis; pedicelli ovario excepto 3 mm. longi glabri; ovarium cylindricum  $1\frac{1}{4}$  mm. longum  $\frac{1}{2}$  num. latum glabrum haud tortuosum, segmentis floris patentissimis. Sepalum posticum lanceolato-ovatum 3 mm. longum  $1\frac{1}{4}$  mm. latum apice lineari-acuminatum ad summum obtusum basi leviter contractum intus convexum extus concavum tenuiter 1-nervium glabrum; lateralia cum postico conformia sed paulo breviora obliquaque. Petala linearia  $2\frac{1}{2}$  mm. longa  $\frac{1}{3}$  mm. lata apice acuminata 1-nervia glabra exteriore valde reflexa. Labellum triangulare 3 mm. longum 2 mm. latum apice cuspidato-acuminatum basi leviter cordatum margine prope basin interiore recurvum, discis 2 linearibus a basi labelli usque ad infra cuspidem extensis a se  $\frac{2}{3}$  mm. distantibus botryoideo-tuberculatis, subtus toto glabrum supra a disco exteriore hirsutum cæterum glabrum basi brevissime unguiculatum, inter unguem et laminam lamella brevissima instruc-

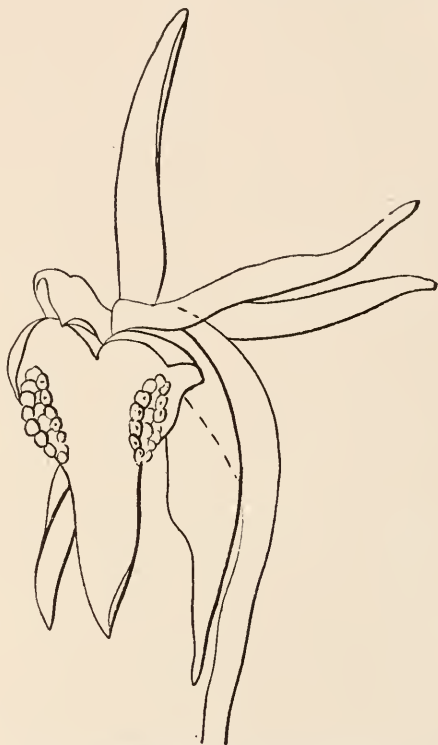


Fig. 10, *Microstylis arisanensis* HAYATA.

tum tenuissime 5-nervium. Columna brevissima cum antheris  $\frac{1}{2}$  mm. longa vel longior; anthera persistens erecta 2-ocularis  $\frac{1}{3}$  mm. longa  $\frac{2}{3}$  mm. lata; pollinia 2 subquadrangulari-formia; clinandrium oblique truncatum, appendicibus lateralibus membranaceis  $\frac{2}{5}$  mm. latis  $\frac{2}{5}$  mm. longis erectis; rostellum late triangulare acutum. Stigma rotundato-cavum.

HAB. Arisan, 8000 ped. alt., leg. U. FAURIE, Junio 1914, No. 924.

Near *Microstylis monophyllos* LINDL., but distinguishable from it in having nearly rounded lateral lobes of the lips.

***Dendrobium* Sw.**

***Dendrobium PèreFauriei* HAYATA** sp. nov. Caulis erectus 60 cm. longus basi teres 3 mm. in diametro parte inferiore excepta medio sursumque tumidus 7 mm. in diametro, internodiis  $2\frac{1}{2}$ –3 cm. longis, sursum foliatus et floratus. Folia oblongo-lanceolata 6–7 cm. longa  $1\frac{1}{2}$  cm. lata apice obtusa ad summum breve apiculata basi plus minus obliqua in exsiccatō chartacea margine integra 5-nervia, venulis 3 inter nervos parallelis, basi cum vaginis articulata, vaginis 2 cm. longis internodium amplectantibus. Racemi circ. 6 cm. longi 3–4-florati ad latus apicis internodii siti, bracteis oblongis acuminatis 3 mm. longis, pedicellis cum ovariis 18 mm. longis. Sepalum posticum ovato-oblongum 15 mm. longum 6 mm. latum apice obtusum basi plus minus contractum tenuiter 5-nervium; lateralia oblique triangulari-oblonga 16 mm. longa basi latissima 1 cm. lata apice acuta vel triangulari-acuta margine fere recta basi cum pede columnæ connata mentum 1 cm. longum 3 mm. latum formantia. Petala oblonga 15 mm. longa 7 mm. lata apice acutissima basi cuneato-contracta tenuiter 5–7-nervia integra. Labellum in ambitu rhomboideum  $1\frac{1}{2}$  cm. longum 1 cm. latum apice obtusissimum basi cuneatim contractum basi erectum medio subito reflexum fere clobatum medio sursum intus minute hirsutum a medio deorsum glabrum margine integrum infra medium medio callo uno crasso disciformi instructum extus glabrum. Columna brevissima 2 mm. longa vel subnulla haud alata, basi ad pedem 1 cm. longum 3 mm. latum apice anteriore recurvum producta.

HAB. Kwarenkō, leg. U. FAURIE, Juli. 1915.

***Dendrobium sanseienne* HAYATA** sp. nov. Epiphytica; rhizoma cum pseudobulbis compositum longe repens squamis dense obtectum, pseudobulbis

subhorizontaliter sitis apice ascendentibus obovoideo-fusiformibus 2 cm. longis 4 mm. latis apice obtusissimis basi longe attenuatis apice 1-foliatis cum foliis articulatis. Folia coriacea oblonga vel obovato-oblonga  $1\frac{1}{2}$ –2 cm. longa 8–10 mm. lata apice rotundata ad centrum emarginata vel brevissime 2-lobata basi subito ad petiolum attenuata margine integerrima deorsum recurva supra nitidissima subtus pallida costa supra impressa subtus elevata, petiolis 3 mm. longis. Flores singuli solitarii pedunculati, pedunculis ab apice pseudobulbi oriundis 1 cm. longis glabris erectis basi bracteis vaginiformibus et medio bracteis singulis instructis, bracteis mediis lanceolatis glabris  $2\frac{1}{2}$  mm. longis apice obtusis glabris basi rhachem complete amplexantibus. Flores solitarii. Ovarium cylindricum pedunculo haud latius. Sepalum posticum ovato-lanceolatum 6 mm. longum  $2\frac{1}{2}$  mm. latum apice acuminatum ad summum obtusum basi leviter constrictum supra basin latissimum 5-nerviū utraque glabrum; lateralia obliquissima triangulari-lanceolata 8–9 mm. longa basi latissima 3 mm. lata cum pede columnæ connata mentum 3 mm. longum formantia apice acuminatissima utraque glabra 5-nervia. Petala triangulari-linearia 5 mm. longa basi latissima 2 mm. lata apice acuminato-obtusa glabra 5-nervia basi partim ad columnam partim ad pedem columnæ adnata. Labellum in ambitu obovato-oblongum 9 mm. longum 4 mm. latum 3-lobatum, lobis lateralibus semi-oblongis 2 mm. latis margine integris in ambitu semi-rotundatis, lobo terminali subrotundato 3–4 mm. in diametro apice breve apiculato basi contracto margine minute croso, discis 2  $\wedge$ -formibus infra lobum terminalem dispositis, nervis centralibus 7–9 parallelis, venis lateralibus contra marginem radiatim divaricatis. Columna 2 mm. longa prominente lateque alata, (alis a medio menti usque ad apicem columnæ extensis), basi ad pedem 4 mm. longum  $1\frac{1}{2}$  mm. latum producta. Anthera oblonga  $1\frac{1}{2}$  mm. longa.

HAB. Giranchō : Mt. Sanseizan, leg. B. HAYATA, Mai. 1916.

Near *Dendrobium Nakaharai* SCHLECHTER; but quite separable from it in the much smaller leaves and flowers.

**Dendrobium Somai** HAYATA sp. nov. Epiphytica. Caules caespitosi recti erecti circ. 60 cm. longi teretes medio 2 mm.– $2\frac{1}{2}$  mm. in diametro nodosi, internodiis 2– $2\frac{1}{2}$  cm. longis reliquis vaginarum toto obtectis, superioribus brevioribus superiore foliiferis. Folia lanceolato-linearia 7 mm. longa 5 mm.

lata apice acuminata basi contracta margine integra, nervis 3 distinctis venulis inter nervos numerosis, vaginis cum internodio æquilongis tubuliformibus circ.  $1\frac{1}{2}$  cm. longis 2 mm. latis, ad latus oris auriculis singulis instructis, auriculis late semi-rotundatis 2 mm. latis 1 mm. longis emarginatis. Flores gemini e latere internodii oriundi furcato-pedicellati. Pedunculi 4 mm. longi basi vaginati, vaginis latere valde complanatis lineari-oblongis 5 mm. longis  $2\frac{1}{2}$  mm. latis apice rotundatis latere uno fissis coriaceis, vaginis intimis tenuissimis membranaceis hyalinis 4 mm. longis 2 mm. latis ore obliquissimis, pedicellis 5 mm. longis glabris; ovario cylindrico-obconico 4 mm. longo  $1\frac{1}{2}$  mm. lato glabro. Sepalum posticum lineari-lanceolatum 13 mm. longum  $2\frac{1}{2}$  mm. latum apice acuminatissimum 7-nervium basi haud vel vix contractum glabrum; lateralia cum postico æquilonga obliqua basi latissima cum pede columnæ mentum 4 mm. longum formantia. Petala angustissime linearia 13 mm. longa 1 mm. lata apice acuminatissima basi haud contracta 3-nervia glabra. Labellum ovatum 13 mm. longum 5 mm. latum medio sursum 3-lobatum, lobo terminali ovato 6 mm. longo 4 mm. lato apice cuspidato-acuminato margine crispulato, trinervium, nervis parallelis, secus nervos elevato-lamellatum, lamellis fimbriatis, disco a basi labelli usque ad medium extenso lineari 6 mm. longo  $\frac{1}{2}$  mm. lato crassiusculo glabro, lobis lateralibus obliquis cum lobo centrali contactis oblongo-triangularibus apice obtuso-acutis  $1\frac{1}{2}$  mm. latis latere interiore 1 mm. longis glabris margine sub-integris. Columna  $2\frac{1}{2}$  mm. longa  $1\frac{1}{2}$  mm. lata.

HAB. in seminario Taihoku culta, leg. T. SŌMA, Aug. 1915, (fl.)

Near *D. furcatopedicellatum* HAYATA, but differs from it by the smaller flowers with glabrous discs.

### *Bulbophyllum* THOU.

**Bulbophyllum Saruwatarii** HAYATA sp. nov. *Cirropetalum Saruwatarii* HAYATA. Epiphytica. Rhizoma repens teres. Pseudobulbus ampulliformis  $2\frac{1}{2}$  cm. longus  $1\frac{1}{2}$  cm. latus ovoides glaber pallidus. Folia solitaria lineari-lanceolata crasse coriacea 7 cm. longa 14 mm. lata apice obtusa vel rarius brevissime 2-lobata basi ad petiolum 1 cm. longum abeuntia. Scapi e basi pseudobulbi oriundi 10 cm. longi ascendentes squamis vaginiformibus secus longitudinem totam 2-3 instructi, squamis vaginiformibus 1 cm. longis, apice flores 5-6 subcapitatum gerentes, sub flore singulo bractea una instructi, bracteis lanceo-



latis 8 mm. longis secus longitudinem plicatis apice acutis vel obtusis glabris tenuibus naviculiformibus pedicellum amplexantibus, pedicellis gracilibus 2 cm. longis subradiatum divaricatis. Flores pallido-lacteo-flavi vel plus minus pallido-viridescens vel rubescens. Sepalum posticum ovatum 1 cm. longum 5 mm. latum basi plus minus contractum glabrum concavum, lateralia basi obliqua linear-lanceolata  $1\frac{1}{2}$  cm. longa 5 mm. lata apice acuminata integra  $\pm$  convoluta dua se firme margine interiore paralleliter contigua. Petala plus minus obliqua 7 mm. longa 5 mm. lata ovata apice rotundata 5-nervia. Labellum ovatum 6 mm. longum 4 mm. latum minute hirsutum crassiusculum basi secus longitudinem plicatum margine sursum valde exteriore recurvum apice obtusum medio subito deorsum recurvum basi subito valde contractum. Columna subnulla a basi usque ad apicem antheræ  $3\frac{1}{2}$  mm. longa ad latus antérieur prominente alata, alis late triangulari-formibus 2 mm. longis 1 mm. latis, basi ad pedem 6 mm. longum productum, pede lineari 6 mm. longo 1 mm. lato apice sursum subito recurvo. Clinandrium utroque latere appendiculis instructum, appendiculis linearibus cuspidiformibus 1 mm. longis.

HAB. Keitao, leg. B. HAYATA, ad 4000 ped. alt., Aprili. 1916.

Near *B. omerandrum* HAY., but distinguishable from it by the entire petals.

**Bulbophyllum transarisanense** HAYATA n. n. *B. viridiflorum* HAYATA Ic. Pl. Formos. II. p. 133 (non SCHLECHTER).

**Eria** LINDL.

**Eria arisanensis** HAYATA Ic. Pl. Formos. III. p. 54 t. 12. Descriptio aucta: Pollinia 8, in loculo singulo 4 superposita.

**Acanthephippium** BLUME.

**Acanthephippium Yamamotoi** HAYATA sp. nov. Terrestris. Pseudobulbi ovoidei 7 cm. longi 3–4 cm. lati apice plus minus rostrati vel haud rostrati 2–3-nodosi, basi radices teretes incrassatas abundanter emittentes. Caulis foliifer haud floratus ad apicem pseudobulbi terminalis circ. 10 cm. longus teres singulus basi vaginatus. Folia 2–3 ampla basi vaginata, vaginis 8–9 cm. longis nervosis, laminis oblongo-ellipticis 30 cm. longis 8 cm. latis apice acuminatis basi acuto-obtusis subito ad vaginam abeuntibus membranaceis nervosis, nervis lateralibus utroque latere costæ 4, venis inter nervos laterales circ. 7, margine



integris. Caulis florifer in specimine nostro 20 cm. longus vaginis multis toto involutus; foliis nondum evolutis, pseudobulbo parvo, racemo ascendenti singulo lateraliter ad latus apicis pseudobulbi sito 10 cm. longo 3-4-florifero plus minus purpurascenti, bracteis ovatis vel oblongis naviculiformibus  $2\frac{1}{2}$  cm. longis, pedicellis glabris cum ovariis 4 cm. longis subteretibus sursum 4 mm. latis. Flores majusculi 4 cm. longi 3 cm. lati extus albo-flavescentes intus rubropunctati. Sepala lata carnea in urceolum obovatum obconicum 4 cm. longum 2 cm. latum coherencia apice libera; posticum fornicatum, parte libera late triangulari apice obtusa; lateralia latere anteriore ab apice usque ad mentum libera basi ad pedem columnae adnata mentum obconicum 2 cm. longum formantia. Petala sepalis inclusa, ad basin columnae adnata sepalis multo angustiora basi cum marginibus membranaceis pedis columnae continua oblonga  $2\frac{1}{2}$  cm. longa  $1\frac{1}{2}$  cm. lata apice obtusa basi cuneato-angustata. Labellum ad apicem pedis columnae articulatim situm inflexum sepalis inclusum 3-lobatum, lobis lateralibus latis erectis supra minute hirsutis, lobo medio lineari crassiusculo supra valde rugosissimo apice breve apiculato. Columna brevis  $1\frac{1}{2}$  cm. longa 7 mm. lata basi in pedem longissimum  $1\frac{1}{2}$  cm. longum medio incurvo-inflexum sursum liberum abeuns, partibus liberis  $2\frac{1}{2}$  cm. longis 5 mm. latis.

HAB. Uraisha, leg. K. YAMAMOTO.

Near *A. sylhetense* LINDL. (Ann. Roy. Bot. Gard. Cale. VIII. t. 154); but different from it in the much longer ovariis and in the discs of the lips.

### *Phajus* LOUR.

***Phajus grandifolius*** LOUR.; MATSUM. et HAYATA Enum. Pl. Formos. p. 410.

HAB. Suisha, leg. B. HAYATA, Mai. 1916. Note:—Segments pale green on the back, but red-purple inside; lip purple towards the tip.

***Phajus Somai*** HAYATA sp. nov. Terrestis. Caulis foliifer distinctus cum foliis 110 cm. longus 7-8-foliatus basi pseudobulbatus, pseudobulbo elongato-ovoideo 5 cm. longo 2 cm. lato pallido-viridi basi dense radicifero basi inferiore hand vaginato. Folia suberecta inferiora minora superiora majora, lamina membranacea fusco-viridi integra 5-nervia, venulis inter nervos 8-15, lanceolata majora 50 cm. longa 9 cm. lata apice acuminata basi gradatim atte-

nuata ad petiolum abeunti, petiolis superioribus petioli-formibus, inferioribus vagini-formibus in longitudine variabilibus circ. 23 cm. longis caulem complete amplexantibus. Caulis florifer distinctus aphyllus vaginatus circ. 80 cm. longus erectus rectus inferiore 12 mm. in diametro sectionis, vaginis inferioribus 4 cm. superioribus 7 cm. longis ore obliquis apice rotundatis vel obtusissimis membranaceis, partibus floriferis 25 cm. longis laxe floratis, bracteis lineari-lanceolatis  $3\frac{1}{2}$  cm. longis apice acutis 5 mm. latis concavis ascendentibus, pedicellis (cum ovariis)  $2\frac{1}{2}$ -3 cm. longis ascendentibus toto glabris. Flores majusculi flavi toto glabri 3-4 cm. longi. Sepalum posticum oblanceolatum 4 cm. longum 12 mm. latum apice acutum basi haud vel vix contractum; sepala lateralibus quam postico breviora plus minus obliqua 33 mm. longa 12 mm. lata apice acuta basi obliqua basi latere superiore obtusa basi latere inferiore cordata vel auriculata toto glabra. Petala oblanceolata obliqua 33 mm. longa 12 mm. lata apice acuta basi angustata margine integra plus minus falcatis deorsum recurva. Labellum glabrum in ambitu obovato-obtriangulare 3 cm. longum basi erectum medio sursum recurvum, lobis lateralibus erectis latis columnam amplexantibus latere integris planis apice crispato-plicatis, lobo terminali latissimo margine validissime crispato-undulato-plicato; calcar brevi 5-6 mm. longo plus minus recurvo 1 mm. in diametro. Columna alba elongata 18 mm. longa semi-teres subulata facie anteriore hirsuta. Pollinia 8.

HAB. Urai, leg. B. HAYATA et T. SÔMA, Mai. 1916.

Near *Phajus maculatus* LINDL. (Ann. Roy. Bot. Gard. Calc. VIII. t. 149); but differs from it in having much longer and looser racemes and in the yellowish lips which are not brown-colored at the margin.

***Bletilla* REICHE.**

***Bletilla formosana*** (HAYATA) SCHLECHT. *Bletia formosana* HAYATA Mater. Fl. Formos. p. 323.

HAB. Kaukaukei, leg. B. HAYATA, Mai. 15, 1916. Note: — Flowers nearly white or very slightly purple.

***Tainia* BLUME.**

***Tainia Shimadai*** HAYATA sp. nov. (Pl. VII. et fig. 11). Rhizoma repens 3 mm. crassum. Pseudobulbus elongato-ovoideo-ampulliformis  $3\frac{1}{2}$  cm.

longus 7 mm. latus glaber apice rostrato-elongatus folio solitario terminatus basi squamis vaginiformibus duobus atro-purpureis instructus. Folia solitaria ex apice pseudobulbi oriunda procumbentia haud erecta elongato-lanceolata cum petiolis 43 cm. longa  $3\frac{1}{2}$  cm. lata apice acuminata basi longe gradatimque attenuata, (partibus attenuatis petioliformibus, partibus petioliformibus 4-5 cm. longis secus medium plicatis versus basin perfecte tubiformibus, partibus tubiformibus 7 mm. longis ad extremitatem plus minus dilatatis), membranacea 3-nervia, (venis inter nervos circ. 9, venulis transversis inter venas remote sitis a se circ. 5 mm. distantibus), utraque pagine glabra margine integra. Scapi gracillimi erecti aphylli glabri pallido-viridi-purpurascens e basi pseudobulbi oriundi circ. 40 cm. longi, basi deorsum

vaginis paucis instructi, (vaginis 4-5 cm. longis tubuliformibus 6 mm. latis glabris nervosis semi-hyalinis ore obliquis apice acutis vel truncatis), medio sursum nudi haud vaginati squamis minutis 1-2 instructi, partibus floriferis 8-11 cm. longis gracillimis remotiuscule floratis; bracteis sub flore singulis, linearibus lanceolatis 3-6 cm. longis acuminatis. Flores racemosi, pedicellis (ovario excepto) 7 mm. longis subpatentibus. Ovarium cylindricum 4 mm. longum glabrum plus minus purpurascens apice 2 mm. latum basi ad pedicellum abeuns sulcatum glabrum apice haud contractum. Sepala pallido-purpurascens purpureo-striata, posticum lineari-oblanccolatum 15 mm. longum apice obtusum  $2\frac{1}{2}$  mm. latum 3-nervium basi attenuatum  $1\frac{1}{2}$  mm. latum; lateralia valde falcata linearia plus quam 10 mm. longa 2 mm. lata apice acuto-obtusa basi haud attenuata 2 mm. lata caeterum ut postico. Petala linearia 12 mm. longa  $2\frac{1}{2}$  mm. lata apice obtusa basi haud contracta  $2\frac{1}{2}$  mm. lata plus minus falcata glabra 3-nervia. Labellum flavum sub sinibus pur-



Fig. 11, *Tainia Shimadai* HAYATA, photographed by Mr. Y. SHIMADA.

purco-maculatum subtus flavum in ambitu obtriangulare 11 mm. longum 8 mm. latum basi triangulari-acutum cum pede columnæ articulatam basi erectum ad 4 mm. altitudinem subito reflexum deorsum recurvum patens, parte patenti (i. e. lamina) late rotundata 8 mm. longa 9 mm. lata 3-lobata, (lobo terminali latissimo  $2\frac{1}{2}$  mm. longo  $7\frac{1}{2}$  mm. lato apice truncato ad centrum brevissime latissimeque triangulari-acuto, lobis lateralibus ascendentibus plus minus interiore recurvis obtusissimis 2 mm. latis, sinibus inter lobos latiusculis  $1\frac{1}{2}$  mm. latis truncatis), glabra medio discis 3-lamellatis flavis integris instructa. Columna erecta 7 mm. longa circ. 2 mm. lata apice alata basi ad pedem producta, pede 2 mm. longo cum sepalis lateralibus connato mentum formanti; anthera latiuscula antice truncata postice cordato-cornuta, cornibus late triangulari-obtusis crassiusculis purpureis.

HAB. Taihoku: Tikushizan, leg. Y. SHIMADA, Aprili. 1915, fl.

Near *Tainia laxiflora* Mx., but differs from it in the very much longer leaves.

### *Calanthe* R. Br.

***Calanthe raishænsis*** HAYATA sp. nov. Terrestis. Folia basi racemi circ. 3 fasciculata, fasciculo squamis 1-2 vaginiformibus involuto, cum petiolis 60 cm. longa suberecta glabra, lamina oblanceolata 30-40 cm. longa  $6\frac{1}{2}$  cm. lata apice subito acuminata vel acuta basi gradatim longeque attenuata ad petiolum circ. 30 cm. longum abeunti tenuiter membranacea. Racemi circ. 60 cm. longi erecti folio æquilongi simplices e centro fasciculi foliorum oriundi glabri, partibus floriferis 12 cm. longis laxè floratis, bracteis linearilanceolatis acuminatis 1-2 cm. longis, pedicellis (cum ovaris) 3-4 cm. longis. Sepalum posticum ovato-lanceolatum 3 cm. longum 8 mm. latum fere 5-nerviū apice acuminatissimum basi rotundatum contractum glabrum; lateralia quam posticum longiora 33 cm. longa 1 cm. lata oblongo-lanceolata apice acuminatissima basi obtusa integra glabra. Petala linearia  $2\frac{1}{2}$  cm. longa 3 mm. lata apice acuminata basi haud contracta 3-nervia. Labellum late rotundatum 22 mm. latum 18 mm. longum 3-lobatum, (lobis lateralibus subrotundatis 5 mm. longis



totiusque latis apice rotundatis interiore recurvis, lobo terminali obtriangulari 1 cm. longo totiusque lato apice margine crispato-plicato ad centrum apicis cuspidate 3 mm. longo instructo toto subglabro), basi ad calcar productum, calcare cum partibus labelli columna connatis  $3\frac{1}{2}$  cm. longo intus extusque plus minus hirsuto deorsum recurvo. Columna 1 cm. longa basi labello connata tubum formans. Anthera triangularis 3 mm. longa totiusque lata apice cuspidate  $1\frac{1}{4}$  mm. longo obtuso instructa basi segittate 2-lobato.

HAB. Raisha, in sylvis 3300 ped. alt., No. 905, Mart. 1914, leg. U. FAURIE.

Near *Calanthe arisanensis* HAYATA, but differs from it in having broader spurs and less crispate lips.

### *Eulophia* R. Br.

***Eulophia ochobiensis*** HAYATA sp. nov. Terrestis aphylla. Tuber ellipticum 10 cm. longum 4 cm. latum abundanter radiciferum, radicibus teretibus incrassatis. Scapi simplices cum racemis 40 cm. longi erecti glabri 7–8 mm. in diametro pallido-purpurei basi squamati, squamis oblongis 2 cm. longis imbricatis apice obtusis vel acutis, racemis vel partibus floriferis 10 cm. longis laxiuscule floriferis, bracteis lanceolatis 3 cm. longis 6 mm. latis apice acuminatis purpureis, pedicellis cum ovariis 6–10 mm. longis glabris. Sepala purpurea; sepalum posticum oblongo-ovatum 17 mm. longum 7 mm. latum apice acutum basi contractum glabrum, lateralia oblique oblongo-ovata 18 mm. longa 7 mm. lata apice acuminata. Petala pallido-flava oblique obovata 11 mm. longa 7 mm. lata apice triangulari-acuta vel obtusa basi breve lateque cuneata ad insertionem 3 mm. lata. Labellum pallidum extus glabrum intus medio apiceque hirsutum late cuneato-triangulare  $1\frac{1}{2}$  cm. longum 12 mm. latum apice late breveque 3-lobatum, lobo terminali triangulari 4 mm. longo totiusque lato apice obtuso, lobis lateralibus apice rotundatis, basi brevissime calcaratum. Columna dorso complanata 6 mm. longa 3 mm. lata pallido-flava.

HAB. Ōchōbi, B. HAYATA, Mai. 13, 1916.

Near *Eulophia macrorhiza* (BLUME Fl. Jav. t. 63 f.-2).



*Cymbidium* Sw.

**Cymbidium arrogans** HAYATA (Fig. 12) Ic. Pl. Formos. IV. p. 76.



Fig. 12, *Cymbidium arrogans* HAYATA.  
Photographed by Mr. Y. SHIMADA.

**Cymbidium albo-jucundissimum** HAYATA (Fig. 13) Ic. Pl. Formos. IV. p. 74.



Fig. 13, *Cymbidium albojucundissimum* HAYATA.  
Photographed by Mr. Y. SHIMADA.

vaginis usque ad medium tubiformibus cum tubo 5-7 cm. longis apice acuminatis, partibus floriferis circ. 15 cm. longis laxe floratis, bracteis lanceolatis 3 cm. longis

**Cymbidium oiwakensis**

HAYATA sp. nov. (Fig. 14). Terrestis, radicibus incrassatis. Folia 7-8-fasciculata, fasciculis basi squamis involutis, linearia 50-60 cm. longa 5-6 mm. lata apice acuta margine praesertim apice minute serrulata nervis manifestis 3, venulis inter nervos 1-2. Racemi distincti aphylli circ. 50 cm. longi foliis aequilongi basi et parte inferiore vaginis instructi,

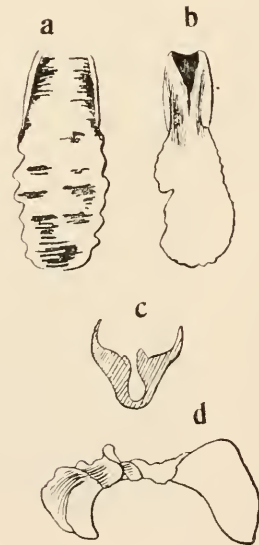


Fig. 14, *Cymbidium oiwakense* HAYATA; a, a lip, showing maculation on the surface; b, the same, showing the disc at the base; c, the same in section; d, the same lip, seen from side.

sursum recurvis ascendentibus glabris apice acuminatis valde concavis, pedicellis (cum ovariis) 2 cm. longis glabris. Flores 4 cm. in diametro. Sepala et petala pallido-viridescencia vel pallido-flavescentia extus purpureo-striata vel haud striata. Labellum fusco-purpureo-maculatum. Sepala lanceolata 27 mm. longa 6-7 mm. lata apice triangulari-acuta basi plus minus angusta glabra. Petala plus minus obliqua ovato-lanceolata 23 mm. longa 8 mm. lata apice acuto-obtusa basi plus minus contracta glabra. Labellum in ambitu ovatum 23 mm. longum ad basin columnæ situm sessile erectum basi concavum, lobis lateralibus latiusculis erectis apice rotundatis semi-oblongis 3 mm. latis columnam laxè amplexantibus, labo medio valde recurvo oblongo 13 mm. longo 8 mm. lato apice obtusissimo margine valde crispato sub lente minute crosso. Disci 2 ( )-formiter dispositi. Columna complanato-semi-teres 14 mm. longa 4 mm. lata margine obscure alata vel haud alata. Fructus fusiformis 4 cm. longus  $1\frac{1}{2}$  cm. latus erectus, stipite  $1\frac{1}{2}$  cm. longo erecto glabro.

HAB. Gökwanzan Oiwake, ad 7500 ped. alt., leg. B. HAYATA, Aprili. 1916.

Differs from the other species of this genus in Formosa in having manifestly denticulate lips.

**Cymbidium rubrigemmum** HAYATA sp. nov. (Fig. 15). Folia linearia tenuiter coriacea 30-40 cm. longa 7 mm. lata apice acuminata basi gradatim attenuata margine sub lente minutissime serrulata, nervis distinctis 3. Scapi



Fig. 15, *Cymbidium rubrigemmum* HAYATA.  
Photographed by Mr. T. Sōma.

cum racemis 25–30 cm. longi erecti basi squamis 3–4 instructi, squamis a se 5 cm. distantibus 5–6 cm. longis apice acuminatis a basi usque ad medium tubiformibus. Racemi 8 cm. longi pauciflorati, bracteis lanceolatis 3 cm. longis 4 mm. latis purpureis, pedicellis cum ovario 2 cm. longis glabris gracilibus.



Fig. 17, *Cymbidium sinense* WILLD. var. *margicoloratum* HAYATA. Photographed by Mr. T. SōMA.

Sepala subæqualia linearia 3 cm. longa 5 mm. lata apice acuta basi leviter contracta. Petala lanceolata plus minus obliqua  $2\frac{1}{2}$  cm. longa 6–7 mm. lata. Labellum oblongo-ovatum 20 mm. longum 8 mm. latum apice obtusum apice margine maculatum. Columna  $1\frac{1}{2}$  cm. longa.

HAB. Taihoku cult. Mart. 1914, leg. T. SōMA.

Near *Cymbidium oreophyllum* HAYATA, but distinguishable from it in having shorter and broader sepals.

***Cymbidium sinense*** WILLD. var. ***margicoloratum*** HAYATA n. v. (Fig. 16–b et 17). Folia lineari-oblanccolata tenuiter coriacea 50–60 cm. longa 2 cm.



Fig. 16, a, *Cymbidium rubrigemmum* HAYATA; b, *Cymbidium sinense* WILLD. var. *margicoloratum* HAYATA.





lata apice acuminata basi gradatim attenuata ad extremitatem subito dilatata apicem pseudobulbi amplectantia, nervis distinctis 3, utraque pagine glabra margine integerrima. Scapi cum racemis 70–80 cm. longi teretes basi squamis 3–4 remote instructi, squamis a se 10 cm. distantibus linearibus apice acuminatis a basi usque ad medium tubuliformibus glabris scariosis 10 cm. longis nervosis. Racemi 30 cm. longi erecti recti remote floriferi, floribus a se 3–4 cm. distantibus, bracteis lanceolatis 1–2 cm. longis acuminatis, pedicellis (cum ovario) 3–2 cm. longis divaricatis. Sepalum posticum lineare 33 mm. longum 5 mm. latum apice obtuso-acutum, lateralia leviter breviora æquilata. Petala lanceolata  $2\frac{1}{2}$  cm. longa 7 mm. lata apice obtusa basi contracta. Labellum ovatum 20 cm. longum 10 mm. latum apice acutum (discis 2-lamellatis) margine apiceque coloratum. Columna 13 mm. longa.

HAB. Taihoku cult. leg. T. SÔMA, Feb. 1914.

Differs from the type in the lips which in this new species are bluish purple at the margin, but not spotted. The lips of *C. sinense* are in greater parts spotted. I have not seen the type of the latter; but according to the description given in LINDL. Gen. et Sp. Orch. p. 162, the lips are “maculatum.” The same character of the lips can be seen in a figure given in the Sômokudsusetsu XVIII. Pl. 11.

#### *Sarcochilus* R. BR.

***Sarcochilus kusukusensis*** HAYATA sp. nov. Epiphytica. Caulis 2–3 cm. longus toto foliatus vaginis foliorum imbricatis obtectus glaber. Folia in exsiccato coriacea linearia 4–5 cm. longa 5–6 mm. lata apice obtusa vel obtusissima ad summum oblique simpliciter apiculata vel breve 2-apiculata basi angustiora margine integra, nervis lateralibus utroque latere costæ 5, vel 1 tum venis inter costas et nervas laterales 1–2, vaginis valde reflexis apice petioli-formibus basi vaginiformibus glabris. Racemi quasi-axillares cum pedunculis 4 cm. longi glabri erecti recti, pedunculis  $3\frac{1}{2}$  cm. longis, rhachibus plus minus incrassatis densissime floriferis 1 cm. longis dense bracteatis, bracteis sub flore singulo unis instructis dense imbricatis cuspidato-triangularibus 3–4 mm. longis glabris dorso acute carinatis in sectione triangularibus, pedicellis cum ovariis 5 mm. longis glabris supra basin articulatis. Flores flavi 5 mm. longi. Sepala flava, posticum oblongum vel oblongo-obovatum  $4\frac{1}{2}$  mm. longum 2 mm. latum apice obtusum basi-



contractum glabrum tenuiter membranaceum 3-nerviū; lateralia postico æquilonga sed latiora plus minus obliqua basi cum pede columnæ connata mentum 1 mm. longum abeuntia. Petala flava obovato-oblonga 4 mm. longa 2 mm. lata apice obtusissima basi cuneato-contracta. Labellum album purpureo-striatum pede columnæ articulatum affixum 3 mm. longum sacciforme; lobi laterales erecti late triangulares; medius obsoletus ad apicem denticulatus et plus minus carnosus; labellum medio et utroque latere apicis callis dense pilosis instructum, et protuberantibus duobus sub apice labelli dispositis. Columna brevis  $1\frac{1}{2}$  mm. longa basi ad pedem 1 mm. longum producta.

HAB. Kuskusu, leg. B. HAYATA, Aug. 1914.

Differs from *S. formosana* HAY. by the far much smaller flowers with yellowish sepals and purple-striate lips.

***Sarcochilus Saruwatarii*** HAYATA sp. nov. (Fig. 18). Epiphytica. Caulis 2 cm. longus toto foliatus et vaginis foliorum imbricatis obtectus glaber.

Folia alterna distiche disposita plana in exsicco membranacea linearia vel linear-oblanccolata 4-5 cm. longa 5-8 mm. lata apice obtusa vel acuta oblique 2-lobata vel integra margine integra basi attenuata cum vaginis articulata, nervis lateralibus utroque latere costæ 3, vaginis 3 mm. longis. Racemi penduli quasi-axillares graciles cum pedunculis 2-3 cm. longi, rhachibus 1 cm. longis valde flexuosis laxissime floratis, floribus 2-3, sub flore 1-bracteatis, bracteis

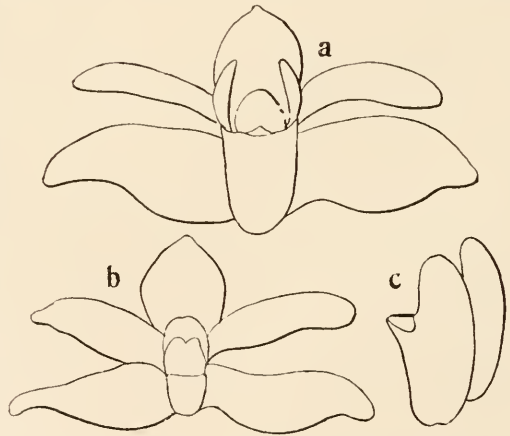


Fig. 18, *Sarcochilus Saruwatarii* HAYATA; a, a flower; b, another flower, lip taken off, showing the foot of the column; c, a lip, seen from side.

ovato-lanceolatis deorsum falcatim recurvis 2 mm. longis transverse patentibus secus costam plicatis alabastrum florum et rhachem racemi amplectantibus. Flores albi. Sepala inæqualia, posticum oblongum 5 mm. longum apice obtusum basi plus minus contractum; lateralia oblique ovato-oblonga 7 mm. longa 3 mm. lata apice obtusa basi haud vel vix contracta. Petala linear-lanceolata

5 mm. longa 1 mm. lata apice obtusa basi haud vel vix contracta. Labellum intus rubro-flavum sacciforme, lobis lateralibus oblongis obliquis 3 mm. longis 2 mm. latis apice truncato-obtusis extus minute hirsutis margine minute crosis intus glabris, lobo medio crassissimo brevissimo triangulari  $\frac{1}{2}$  mm. longo, sub lobo medio disco crasso uno insito; gibbo labelli in fundo densissime piloso. Columna brevissima  $\frac{1}{2}$  mm. longa subalata cum alis  $1\frac{1}{2}$  mm. lata basi ad pedem 2 mm. longum producta.

HAB. Keitao, leg. B. HAYATA, Aprili. 1916.

Approaches to *S. formosanus* HAY., but distinguishable from it by the far much smaller lips and racemose inflorescence.

*Saccolabium* BLUME.

**Saccolabium formosanum** HAYATA Mater. Fl. Formos. p. 336. Descriptio aucta: Fructus cylindricus pedicello excepto 2 cm. longus 5 mm. latus utrinque contractus obtusus plus minus obliquus, pedicello 5–6 mm. longo.

*Tropidia* LINDL.

**Tropidia Somai** HAYATA sp. nov. (Pl. XIII.). Rhizoma ascendenterectum ad caulem gradatim abeunt; pseudobulbus nullus. Caulis in nostro specimine 2–3-fasciculatus cum racemis 17–20 cm. longus glaber florifer suberectus interdum efoliatus interdum 1–2-foliatus cramosus basi usque ad medium 2–5-vaginato-squamatus, squamis inferioribus vaginiformibus 7 mm.–15 mm. longis ore obliquissimis apice acutis nervosis glabris superioribus longioribus usque ad  $3\frac{1}{2}$  cm. longis ad medium tubuliformibus sursum lamini-formibus apice acuminatis, foliis si adsunt supra medium caulis 1–2-dispositis. Folia membranacea oblongo-cordata ovato-oblonga vel lanceolata 9–7 cm. longa 6–2 cm. lata apice acuminata ad summum breve aristata basi subcordata rotundata obtusa vel acuta semper ad petiolum  $1-1\frac{1}{2}$  cm. longum caulem amplexantem gradatim abeuntia, margine integra 7-nervia, nervis supra minus subtus plus elevatis (in exsiccat). Racemi 3–4 cm. longi recti, bracteis lanceolatis 6–7 mm. longis apice acuminatis basi rhachin semi-amplexantibus glabris, pedicellis cum ovario 5 mm. longis glabris. Sepalum posticum lanceolatum 6 mm. longum basi latissimum acuminatissimum glabrum; lateralia apicibus exceptis perfecte connata ventricum formantia erecta apice acuminata lanceolata, ventrico sub insertione 2 mm. longo 2 mm. lato. Petala lanceolata sepalo postico breviora.

Labellum ovato-lanceolatum circ. 6 mm. longum erectum glabrum ventricosocalcaratum, lamina lanceolata 4 mm. longa. Columna 2 mm. longa, rostello obliquissimo triangulari-lanceolato apice 2-fido; anthera dorsalis e basi columnæ oriunda lanceolata apice acuminata 3 mm. longa  $\frac{3}{4}$  mm. lata. Pollinia lineari-lanceolata 2 mm. longa apice attenuata ad caudiculam 2 mm. longam abeuntia; glandula lineari-oblonga 1 mm. longa. *Tropidia angulata* HAYATA in MATSUM. et HAYATA Enum. Pl. Formos. p. 414 (non BLUME).

HAB. Akō: Datestu, leg. T. SŌMA, Juli. 1912.

Near *Tropidia angulata* BLUME (KING et PANTLING Orchid. t. 365), but distinguishable from it in having much inflated lips and sepals.

*Spiranthes* L. C. RICH.

***Spiranthes australis* LINDL. var. *suishænsis* HAYATA n. v.**  
Terrestris. Radices incrassatæ e basi canlis 3–4 oriundæ teretes 5 cm. longæ 3 mm. crassæ. Canlis 30–50 cm. altus glaber teres basi foliis 2–3 medio squamis 1–2 instructus sursum ad spicam 10–20 cm. longam abeuns simplex haud ramosus. Folia inferiora majora oblanceolato-linearia 12–15 cm. longa 5–7 mm. lata apice obtusa vel acuta basi gradatim attenuata ad vaginam abeuntia, vaginis 1–6 cm. longis, toto glaberrima membranacea, nervis lateralibus utroque latere costæ 3, venulis obliquis reticulatis. Spicæ 10–20 cm. longæ simplices. Flores perfecte albi approximativè secundeque dispositi, bracteis post anthesin auctis lanceolatis. Ovarium obovoideum plus minus obliquum 2–3 mm. longum glabrum vel plus minus hirsutum. Rhachis tortuosa minute hirsuta, bracteis ovatis 5–6 mm. longis 2–3 mm. latis concavis basin florum amplexantibus apice longe acuminato-cuspidatis glabris. Segmenta toto conniventia toto alba. Sepala trincervia; posticum lineare 5 mm. longum  $1\frac{1}{3}$  mm. latum apice obtusum basi haud contractum glabrum; lateralia quam postico angustiora apice acuminato-obtusa 5 mm. longa 1 mm. lata. Petala quam sepalum tenuiora 5 mm. longa 1 mm. lata apice obtusissima 1-nervia. Labellum in ambitu oblongum 4–5 mm. longum  $2\frac{1}{2}$  mm. latum apice obtusissimum basi erectum concavum columnam amplexans apice patens margine basi usque ad medium integrum medio sursum valde crispatum erosum ad paginam medio sursum breve crispato-hirsutum basi leviter gibbosum, gibbis intus protuberantibus duobus instructis. Columna 1 mm. longa.

HAB. Suisha, ad 2500 ped. alt., leg. B. HAYATA, Aprili. 1916.

This differs from the common *Spiranthes australis* by the perfectly white flowers with 2 rounded protuberances at the base of the lips. The protuberances are in *S. australis* are hooked and bent downwards.

***Physurus* RICH.**

***Physurus chinensis* ROLFE ; MATSUM. et HAYATA** Enum. Pl. Formos. p. 409.

HAB. Karapin, leg. B. HAYATA, Mart. 1914. Note :—Flowers light ashy-purple or nearly white.

***Galeola* LOUR.**

***Galeola ochobiensis* HAYATA** sp. nov. (Fig. 19). Fulvescens ad truncos repens, radicibus numerosis incrassatis, radicibus aëriis oppositi-ramis teretibus in nostro specimine 3–4 cm. longis.

Caulis glaber teres ad nodos 1-squamatus, squamis ovatis obtusis ramos semi-amplexantibus 1–2 cm. longis. Racemi paniculato-ramosi, ramis 3–5 cm. longis, bracteis ovatis acutis 3 mm. longis persistentibus, pedicellis cum ovariis 4–5 mm. longis glabris. Flores pallido-lacteo-rubrescentes glabri. Sepala

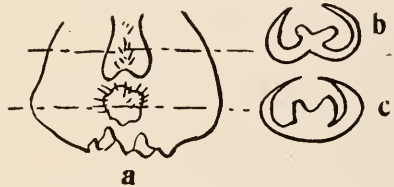


FIG. 19, *Galeola ochobiensis* HAYATA; a, a lip, expanded; b, c, sections of the same lip, which is not unfolded.

conniventia demum plus minus patentia, posticum oblongo-lineare 12 mm. longum 3 mm. latum glabrum apice obtusum, lateralia quam postico latiora 4 mm. longa apice obtusissima basi laud contracta. Petala angusta linearia et spathulata 12 mm. longa 2 mm. lata apice obtusissima vel rotundata basi attenuata. Labellum ad basin columnæ sessile latum concavum columnam laxè involvens sepalis æquilongum 10 mm. longum in explicato 10 mm. latum obscure 3-lobatum, lobis lateralibus latissimis transverse venulosis, lobo medio minuto undulato-crispo facie villosa callis duobus instructo, callo superiore subrotundato villosa, callo inferiore minus villosa. Columna 7 mm. longa exalata apoda. Capsula linearis cylindrica pendula 16 cm. longa 5 mm. lata.

HAB. Ōchōbi, leg. B. HAYATA, Mai. 14, 1916.

Found climbing on a tree in forests on a cliff at the sea-coast. Near *G. altissima* REICH. f.; but differs from it in having differently shaped lips.



*Vanilla* Sw.

**Vanilla Somai** HAYATA sp. nov. (Pl. XIV.). Epiphytica. Caulis ramosus scandens glaber teres viridis flexuosus. Folia alterna oblongo-lanceolata 17 cm. longa  $5\frac{1}{2}$  cm. lata apice acuminata ad summum obtusa basi contracta rotundata vel truncata margine integra coriacea plana utraque glabra, nervis in exsiccatō utraque elevatis 25–30 parallelis, petiolis 1 cm. longis dilatatis semi-amplexicaulibus. Racemi quasiterminales 2–3 cm. longi sessiles; rhachibus flexuosis multifloratis sed abortu 1–2-floratis, bracteis oblongo-triangularibus membranaceis  $1-1\frac{1}{2}$  cm. longis naviculiformibus plicatis glabris apice obtusis vel acutis divaricatis, pedicellis cum ovariis 3–4 cm. longis gracilibus 2–3 mm. latis glabris. Flores 4 cm. longi pallido-virides; sepalum posticum oblanceolatum 4 cm. longum 1 cm. latum apice abrupte acutum ad summum obtusum basi attenuatum glabrum, lateralia plus minus obliqua quam posticum angustiora. Petala lineari-oblanceolata 4 cm. longa 5 mm. lata apice abrupte acuminata basi gradatim attenuata. Labellum pallido-viride extus sursum leviter roseum 4 cm. longum tubuloso-infundibuliforme in explicato obtriangulare 3-lobatum margine crenulatum (lobo medio minuto deorsum subito recurvo viridi) medio fasciculo pilorum 5 mm. longo 3 mm. lato instructum apice viridissimum pilis brevibus conspersum, medio lineis miniatis 2 cm. longis recurvis utroque latere sitis. Columna 3 mm. longa.

HAB. Remogan, leg. B. HAYATA et T. SŌMA, Mai. 1916.

Near *Vanila Griffithii* var. *formosana*; but differs from it in having pale green cream-colored lips.

*Vrydagzynia* BLUME.

**Vrydagzynia formosana** HAYATA sp. nov. Caulis basi repens ad nodos radicans sursum ascendens suberectus, partibus erectis circ. 10 cm. longis teretibus foliatis glabris. Folia glabra alterna versus apicem caulis fere approximativè disposita, lamina oblonga  $2\frac{1}{2}-3\frac{1}{2}$  cm. longa  $1\frac{1}{2}$  cm. lata apice acuta ad summum acutissima basi obtusa vel rotundata subito ad petiolum cum vaginis 1 cm. longum abeunti, petiolis basi vaginiformibus, vaginis 5 mm. longis  $2\frac{1}{2}$  mm. latis. Racemi terminales solitarii cum pedunculis 5 cm. longi, pedunculis  $2\frac{1}{2}$  cm. longis hirsutis, bracteis ovato-lanceolatis apice obtusis basi vix contractis extus hirsutis intus glabris margine ciliolatis valde concavis alabastrum



floris amplexantibus, pedicellis (=ovariis sessilibus) 6 mm. longis 1 mm. latis hirsutis. Segmenta conniventia extus sparse hirsuta intus glabra sursum albicantia deorsum viridescantia. Sepalum posticum lineari-lanceolatum 6 mm. longum 2 mm. latum apice obtusissimum leviter dilatatum basi vix contractum cum petalis galeam formantia. Sepala lateralia obliqua  $5\frac{1}{2}$  mm. longa  $2\frac{1}{2}$  mm. lata apice obtusa basi valde obliqua latere inferiore auriculato-cordata latere superiore acute ovato-oblonga. Petala oblique ovato-lanceolata  $4\frac{1}{2}$  mm. longa 2 mm. lata apice attenuata ad summum perfecte truncata ad summum  $\frac{1}{2}$  mm. lata basi contracta 1-nervia. Labellum erectum oblongum apice obtusissimum medio callo uno crassiusculo notatum, basi ad calcar latissimum 4 mm. longum 2 mm. latum productum. Columna brevis  $1\frac{1}{2}$  mm. longa crassiuscula anteriore apice 2-cornuta, cornibus (stigmatosis)  $\frac{1}{2}$  mm. longis obtusissimis; anthera rotundata  $1\frac{1}{2}$  mm. longa totiusque lata. Rostellum triangulare  $1\frac{1}{2}$  mm. longum. Calcar intus callis 2 longe stipitatis a columnæ basi descendentes instructum.

HAB. Inter Urai et Agioku, leg. B. HAYATA, Mai. 1916.

Near *V. gracilis* BLUME.

*Zeuxine* LINDL.

***Zeuxine tabiyahanensis*** HAYATA sp. nov. = *Adenostylis tabiyahanensis*

HAYATA. Terrestis. Caulis basi repens ad nodos radicefer, partibus ascendentibus 20 cm. longis erectis usque ad medium foliiferis simplicibus, apice ad racemum abeuntibus deorsum glabris sursum hirsutis. Folia plus minus obliqua vel æqualia oblonga vel elongato-oblonga 5–7 cm. longa  $2\frac{1}{2}$  cm. lata apice acuta ad summum acutissima basi acuta subito ad petiolum 1 cm. longum abeuntia margine integra chartacea vel membranacea utraque pagine glabra, nervis lateralibus utroque latere costæ 1, venis inter costam et nervos laterales 3–4, petiolis basi vaginatis cum vaginis  $2\frac{1}{2}$  cm. longis, vaginis 1– $1\frac{1}{2}$  cm. longis  $\frac{1}{2}$  cm. latis, ore obliquo. Racemi simplices terminales 6 cm. longi laxè floriferi hirsuti, bracteis lanceolatis  $1\frac{1}{2}$  cm. longis 4 mm. longis plus minus hirsutis. Ovarium oblique cylindricum utroque constrictum 1 cm. longum hirsutum. Sepala suberecta extus hirsuta intus glabra; posticum oblongum 1 cm. longum 7 mm. latum apice triangulari-acutum ad summum obtusum basi hand contractum ad summum obtusum valde concavum cum petalis galeam formans 3-nervium; lateralia elongato-oblonga postico æquilonga 4 mm. lata apice

obtusissima basi leviter contracta 3-nervia integra plus minus obliqua. Petala glabra cultriformia vel semi-obovata 1 cm. longa 4 mm. lata apice obtusa basi attenuata margine interiore subrecta margine exteriori curva, margine exteriori prope apicem crenulata 2-nervia. Labellum basi cum alis columnae connatum erectum basi (hypochilo) saccato-concavum, hypochilo 5 mm. longo 3-nervio ad nervos laterales fimbriis instructo, medio (mesochilo) angustato 2 mm. longo sulcato basi auriculis instructo; lamina, (epichilo) 2-lobata, lobis divaricatis late obtriangularibus 4 mm. longis apice fere truncatis latissimis 5 mm. latis basi 2 mm. latis apice dentato-crisis latere integris duobus se angulo  $180^\circ$  egressis utraque pagine breve hirsutis. Columna brevis 2 mm. lata 2 mm. longa facie anteriore 2-alata apice 2-cornuta, cornibus membranaceis deorsum  $\odot$ -formiter recurvatis 2 mm. longis; rostellum longe 2-fidum, segmentis linearibus  $2\frac{1}{2}$  mm. longis; anthera elongata triangularis 3 mm. longa  $1\frac{1}{2}$  mm. lata apice acuta basi sagittata; stigmata 2 utroque latere basis rostellii disposita sessilia.

HAB. Tabiyahanzan, leg. B. HAYATA, Mai. 1916.

The present species approaches to *Cheirostylis*, *Zeuxine Odontochilus* and *Anæctochilus*, but is not referable to neither. The new orchid is different from *Cheirostylis* in having distinct sepals and petals, from *Zeuxine* and *Odontochilus* in the lateral arms of the columns, and from *Anæctochilus* by not having distinct spurs. As the specimen is wanting pollinia, it is quite uncertain as to its proper genus.

***Myrmechis*** BLUME.

***Myrmechis drymoglossifolia***

HAYATA sp. nov. (Fig. 20). Terrestris basi procumbens ad nodos radicans, partibus erectis 4-7 cm. longis. Caulis teres glaber vel subglaber. Folia alterna petiolata rotundato-ovata 6-7 mm. longa 5-6 mm. lata apice triangulariobtusata basi rotundato-truncata margine integra vel crispato-repandulata

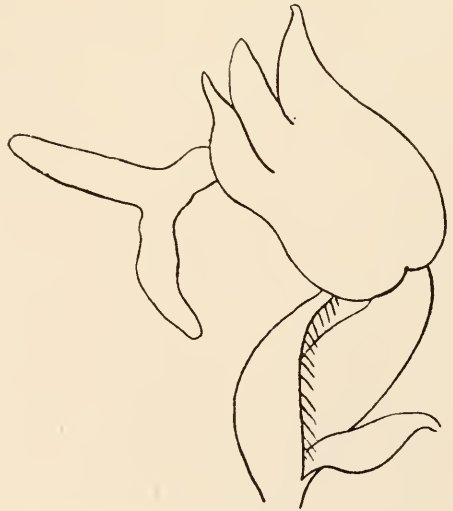


Fig. 20, *Myrmechis arisanensis* HAYATA.

3-nervia, nervis tenuissimis, utraque glaberrima, petiolis cum vaginis 3-4 mm. longis dorso complanatis basi vaginatis, vaginis 1-2 mm. longis 1-1½ mm. latis obconiciformibus glabris semi-hyalinis membranaceis ore obliquis. Flores terminales solitarii pedunculati, pedunculo (ovario excepto) 6 mm. longo basi apiceque bracteato hirsuto; bractea inferiore basi vaginata, vagina tubiformi 1-2 mm. longa ore ciliata, lamina ovata circ. 2 mm. longa glabra; bractea superiore ovata 4 mm. longa ovarium amplexantem hyalina margine retrose ciliata; ovario ovato-lineariter 4-5 mm. longo glabro 1½ mm. lato. Sepala et petala basi usque ad medium conniventia ovato-lineariter 6 mm. longa apice attenuata conniventia tubum 3-4 mm. latum formantia toto glabra. Labellum Y-forme: hypochilo cum tubo perianthii conniventi; mesochilo libero lineariter 2 mm. longo 1 mm. lato, lamina (epichilo) V-forme bipartita, partibus divaricatis linearibus 2 mm. longis 1 mm. latis. Columna nulla; anthera dorsalis ovata 1½ mm. longa apice attenuata; pollinia 2 sectilia; stigma ignotum.

HAB. Arisan, 8000 ped. alt., leg. U. FAURIE, Juni. 1914, (No. 929).

Near *Myrmechis gracilis* BL. and *M. japonica* ROLFE; but differs from them in having much smaller leaves.

### *Goodyera* R. BR.

***Goodyera arisanensis*** HAYATA sp. nov. Caulis cum spicis 25 cm. longus glaber basi 5-6-folius erectus apice ad spicam abeuns sursum squamis 8-9 remote instructus. Folia oblonga vel ovato-oblonga 4 cm. longa 1½ cm. lata apice acuta vel breve acuminata basi acuta margine integra chartacea vel crasse membranacea utraque pagine glabra, petiolis 2 cm. longis dilatatis basi vaginatis, vaginis ½ cm. longis hyalinis, ore obliquo. Spicæ terminales simplices 11 cm. longæ densiuscule floratæ, bracteis lanceolatis post anthesin auctis 3 mm. longis acuminatis ovario æquilongis. Ovarium ovoideo-fusiforme 3 mm. longum glabrum. Segmenta conniventia 3 mm. longa. Sepalum posticum ovato-lanceolatum 3 mm. longum 1 mm. latum glabrum 1-nervium, nervo manifesto, glabrum cum petalis galeam formans basi plus minus contractum; lateralia oblique lanceolato-oblonga 3½ mm. longa 1¼ mm. lata postico latiora glabra manifeste 1-nervia apice obtusa vel acuta basi haud contracta. Petala lineariter lanceolata 3½ mm. longa ⅔ mm. lata apice obtusa basi angustata tenuiter mem-

branacea 1-nervia. Labellum subsaccatum subrectum haud recurvum  $2\frac{1}{2}$  mm. longum  $1\frac{1}{2}$  mm. profundum extus glabrum apice triangulari-acutum, sacco apice rotundato intus glabro lineis callosis cristatis duabus instructo. Columna brevissima  $\frac{1}{2}$  mm. longa; rostellum membranaceum aristato-2-fidum. Capsula ellipsoidea 7 mm. longa 4 mm. lata utrinque valde constricta glabra vel sparsissime hirsuta. Anthera ovata 1 mm. longa apice 1-aristata.

HAB. Mt. Arisan, ad 2500 m. alt., leg. U. FAURIE, Dec. 1914.

Near *Goodyera nantoensis* HAYATA, but differs from it in having larger flowers and leaves with different venation.

**Goodyera cyrtoglossa** HAYATA Ic. Pl. Formos. p. 113.

HAB. Rōsuikēi, leg. B. HAYATA, Aprili. 1916. Note:—Some of the flowers are upside down; rhachis purple-red; segments pale-ochraceous, column green, lip white.

**Goodyera longicolumna** HAYATA sp. nov. Caulis teres basi procumbens ad nodos 3 cm. se remotos 5 mm. crassos radices 2-3 emittens, radicibus teretibus incrassatis, basi sursum ascendens, parte ascendenti cum spicis 30 cm. longa simplici a basi usque ad medium foliosa erecta sursum ad spicam simplicem 7 cm. longam abeunti deorsum glabra sursum minute hirsuta. Folia 9-10 oblonga vel elliptica membranacea glaberrima 9-10 cm. longa  $4\frac{1}{2}$  cm. lata apice breve cuspidato-acuminata vel acuta ad summum obtusa basi obtusa subito cuneatim ad petiolum abeuntia margine integra, nervis lateralibus 5-6 utroque latere costæ, petiolis circ. 6 cm. longis gracilibus basi subito dilatatis subvaginatis caulem amplectantibus. Spicæ (vel racemi) simplices circ. 10 cm. longæ erectæ dense vel densiuscule floriferæ, bracteis lanceolatis hirsutis margine aristato-ciliolatis  $1\frac{1}{2}$  cm. longis acuminatis ascendentibus. Ovarium lineare 7 mm. longum breve hirsutum. Segmenta extus toto hirsuta. Sepalum posticum oblongo-lanceolatum 8 mm. longum 3 mm. latum apice obtusissimum basi vix vel haud contractum cum petalis galeam formans manifeste 1-nervium, lateralia postico æquilonga fere æquiformia apice obtusa. Petala oblanceolato-spathulata 8 mm. longa 2 mm. lata apice obtusissima basi gradatim attenuata tenuissime membranacea manifeste 1-nervia. Labellum saccatum 7 mm. longum 4 mm. latum apice triangulari-acutum ad summum obtusum, sacco intus hirsuto. Columna cum rostellis 5 mm. longa  $1\frac{1}{2}$  mm. lata, rostellis 2-lobo, lobis acutis.



Anthera ovata 3 mm. longa apice acuminata.

HAB. Urai, leg. S. SASAKI, Aprili. 1910.

Remarkable for the rostellum which is much longer than that of any other species of the genus in the island.

***Gastrodia* R. Br.**

***Gastrodia dioscoreirhiza* HAYATA** sp. nov. Terrestriis aphylla. Tuber longissimum cylindricum vermiforme recurvum haud radiciferum 20–30 cm. longum 10–20 cm. in diametro rugosissimum squamis tenuissimis hyalinis sparse obtectum apice ad scapum abeuns. Scapi complanati fulvo-rubescences hac atque illac vaginis brevibus instructi. Rhachis florifera 3–4 cm. longa glabra, bracteis oblongis 3 mm. longis 2 mm. latis apice obtusis valde-concavis glabris, pedicellis erectis glabris ovario excepto 4 mm. longis, ovariis obconico-cylindricis apice haud contractis 2 mm. latis 2 mm. longis basi attenuatis. Sepala cum petalis connata tubum formantia fulvo-rubescencia, tubo circ. 1 cm. longo 4 mm. lato 5-lobato, lobis exterioribus (sepalis) 1–2 mm. longis semi-clausis valde concavis intus laevibus extus tuberculatis, lobis interioribus (petalis) rotundatis  $1\frac{1}{2}$ –2 mm. longis laevibus  $1\frac{1}{2}$  mm. latis basi contractis. Labellum..... Columna elongata triquetra ad angulos manifeste alata.

HAB. Giranehō : Soseikyaku, leg. B. HAYATA, 12, Mai. 1916.

Very remarkable for its long cylindrical tubers.

***Platanthera* Rich.**

***Platanthera stenoglossa* HAYATA** Ic. Pl. Formes. IV. p. 123.

HAB. Rankanzan, leg. B. HAYATA ad 4000 ped. alt., Mai. 1916.

Note : — Rhachis and sepals pale green ; petals and lips pale yellow.

***Gymnadenia* R. Br.**

***Gymnadenia Tominagai* HAYATA** sp. nov. Terrestriis. Caulis simplex 8–10 cm. longus erectus subrectus gracillimus supra basin 2-foliatus apice 1–2-floratus. Folia alterna oblanceolata 4 cm. longa  $3\frac{1}{2}$  mm. lata apice acuta basi gradatim attenuata erecta membranacea integra. Flores 1–2 terminales vel laterales, bracteis lanceolatis 1 cm. longis 3 mm. latis apice acuminatis glabris. Ovarium sessile ovoideo-cylindricum 7 mm. longum glabrum. Sepala inaequalia ; posticum erectum intus concavum oblongum 6 mm. longum apice obtusum basi plus minus contractum glabrum 3-nerviū, lateralia quam



posticum majora 7-8 mm. longa 4 mm. lata basi obliquissima basi latere inferiore rotundata. Petala ovato-oblongo-triangularia 6 mm. longa 3 mm. lata apice triangulari-acuta vel obtusa dorso apice plus minus carinata basi valde obliqua latere inferiore auriculato-rotundata basi latere superiore rotundata basi plus minus brevissime unguiculata. Labellum ad basin columnæ adnatum sessile anteriore expansum secus longitudinem deorsum leviter plicatum, lamina in ambitu obtriangulari 1 cm. longa totiusque lata medio 3-lobata, lobis lateralibus triangularibus lobo centrali æquilongis a lobo centrali angulo  $45^{\circ}$  egressis apice acutis, lobo centrali rectangulariformi 3-4 mm. longo 3 mm. lato apice 3-cuspidato, tota pagine tuberculatum, tuberculis acutis minutissimis, basi calcaratum, calcare infundibuli-tubuliformi  $5\frac{1}{2}$  mm. longo 1 mm. lato apice acuto. Columna brevissima  $1\frac{1}{2}$  mm. longa.

HAB. Nantôchô : Gundaizan, leg. T. TOMINAGA, Aug. 1916.

Near *Gymnadenia lepida* REICHB. fil., but separable from it by the much narrower erect leaves.

### *Habenaria* WILLD.

**Habenaria Miersiana** CHAMP. ; MATSUM. et HAYATA Enum. Pl. Formos. p. 419.

HAB. Shakkô, leg. U. FAURIE, (No., 951) Sept. 1914.

## Hæmodoraceæ.

### *Peliosanthes* ANDR.

**Peliosanthes arisanensis** HAYATA sp. nov. (Pl. XV.) Rhizoma nodosissimum repens 5 mm. crassum recurvum dense radicans, radicibus incrassatis  $1\frac{1}{2}$ -2 mm. crassis. Folia singulariter disposita haud fasciculata longe petiolata oblanceolata chartaceo-membranacea 23-25 cm. longa 5-6 cm. lata apice acuminata basi gradatim recto-attenuata ad petiolum abeuntia margine integra sub microscopio minutissime serrulata utraque pagine glabra multi-nervia, venulis tessellatis, in specimine exsiccatO nervis venis venulis tessellatisque totis elevatis distinctis, petiolis 25-26 cm. longis subteretibus glabris toto nudis haud squamatis. Scapi cfoliati esquamati perfecte nudi 30-35 cm. longi (cum racemis) erecti recti glabri subteretes apice racemosi ; racemi circ. 10 cm. longi laxiuscule florati, floribus tortu subsecunde dispositis basi bracteatis, bracteis

linearibus 1–2 cm. longis 2–3 mm. latis apice acuminatis basi latissimis dorso extus 3–nerviis leviter 3–carinatis valde concavis naviculiformibus descendens apice ascendente-recurvis. Flores nutantes supra-axillares, ex altitudine 1 mm. supra axillas bractearum oriundi pedicellati, pedicellis glabris recto-descendentibus 3 mm. longis apice cum flore articulatis basi latere inter bracteam et pedicellum bracteola singula instructis, bracteolis glabris triangulari-lanceolatis 4 mm. longis intus concavis subplicatis naviculiformibus extus a basi usque ad apicem prominente carinatis apice interiore recurvis descendens. Perianthium obconicum circ. 8 mm. longum 6–lobatum, tubo obconico 4 mm. longo 7 mm. lato glabro, lobis 3 exterioribus oblongo-triangularibus 6 mm. longis 4 mm. latis apice triangulari-obtusis basi leviter contractis utraque glaberrimis crassiusculis suberectis, lobis 3 interioribus æquilongis sed minus latis. Corolla secunda e basi loborum perianthii oriunda erecta late tubosa 3 mm. longa 6 mm. lata crassissima extus intusque brevissime hirsuta apice plus minus contracta ore semi-clausa brevissime latissime 6–dentata vel subintegra intus infra apicem antherifera, antheris sessilibus rotundato-oblongis  $\frac{3}{4}$  longis  $\frac{3}{8}$  mm. latis apice emarginatis basi 2–lobatis interiore dehiscentibus. Ovarium 5 mm. longum cum tubo perianthii ad 2 mm. altitudinem connatum sursum 3 mm. liberum (parte libera late coniciformi) brevissime densissime pilosum apice triangulari-acutum ad stylum glabrum brevem 1 mm. longum crassiusculum abeuns, deorsum 3–loculare sursum 1–loculare ovulis e basi loculorum oriundis linearibus 2 mm. longis  $\frac{1}{3}$  mm. latis erectis in loculo singulo 2–3. Styli apice clavati ad summum leviter 3–lobati, stigmatibus ad summum styli  $\wedge$ -forme dispositis. Bacca globosa 1–sperma. Semina globosa 7 mm. in diametro, testa? crassissima spongiosa? Embryo linearis centralis 4–5 mm. longus 1 mm. latus subteres vel plus minus complanatus. *Peliosanthes courtallensis* HAYATA Fl. Mont. Formos. p. 225 (non WIGHT).

HAB. Mt. Arisan, prope Karapin, leg. B. HAYATA et S. SASAKI, Jan. 1912; leg. G. NAKAHARA.

Near *Peliosanthes courtallensis*, but differs from it in the much smaller flowers.

**Peliosanthes Tashiroi** HAYATA sp. nov. Rhizoma repens, radicibus incrassatis. Folia singulariter sita longe petiolata elongato-oblonga vel lanceolata circ. 20 cm. longa 3–7 cm. lata apice acuminata basi attenuata gradatim ad petiolum abeuntia margine integra sed sub microscopio minutissime serrulata chartaceo-membranacea utraque pagine glabra, nervis venis venulis tessellatisque utraque pagine in exsiccato distincte visis, petiolis basi nudis haud squamatis glabris subteretibus 24–25 cm. longis laminam foliorum in longitudine superantibus. Scapi cum racemis 12–22 cm. longi erecti glabri haud foliatis haud squamati glabri. Racemi 15–10 cm. longi glabri laxiuscule floriferi tortu subsecunde dispositis. Flores subnutantes, bracteis et bracteolis ut in *P. arisanensis*, sed quam iis minoribus vel interdum bracteolis medio pedicelli sitis, pedicellis 4 mm. longis descendentibus glabris cum perianthio articulatis. Perianthium 5-lobatum late campanulatum  $1\frac{1}{2}$  cm. latum extus glabrum, tubo late campanulato 2 mm. longo  $4\frac{1}{2}$ –5 mm. lato glabro, lobis 5 triangulari-oblongis 5–6 mm. longis 4 mm. latis apice obtusis basi plus minus contractis margine integris sed minute ciliolatis vel haud ciliolatis extus glabris intus brevissime hirsutis. Corolla secundaria 2 mm. longa semi-globosa 5 mm. lata extus brevissime densissime hirsuta apice ore semi-clausa contracta 5-lobota, (lobis brevissimis late triangularibus 1 mm. latis  $\frac{1}{4}$  mm. longis late acutis) intus hirsuta infra apicem lorum intus antherifera. Stamina 5, antheris sessilibus rotundato-ovatis  $\frac{4}{5}$  mm. longis  $\frac{2}{3}$  mm. latis apice emarginatis basi 2-lobatis interiore dehiscentibus. Ovarium subliberum fere superum basi leviter cum tubo perianthii connatum conicum brevissime dense hirsutum 2 mm. longum  $2\frac{1}{2}$  mm. latum basi latissimum sursum attenuatum apice ad stylum brevissimum glabrum 1 mm. longum apice stigmatiferum abeuns, ovulis a basi loculi oriundis paucis erectis. Bacca ellipsoidea, 1-sperma. Semina 7 mm. longa 6 mm. lata ellipsoidea, testa crassissima spongiosa?

HAB. Taihoku cult.: leg. Y. TASHIRO, Feb. 1912.

Near *P. arisanensis* HAYATA, but separable from it by the pentamerous flowers.

## Liliaceæ.

*Heterosmilax* KUNTH.

**Heterosmilax arisanensis** HAYATA Ic. Pl. Formos. V. p. 235, descriptio aucta: Perianthium floris ♀ ovoidco-fusiforme 4 mm. longum 3 mm. latum glabrum apice leviter trilobatum, lobis triangularibus  $\frac{1}{2}$  mm. longis obtusis semi-clausis glabris. Staminodia 3 linearia  $2\frac{1}{2}$  mm. longa  $\frac{1}{4}$  mm. lata complanata glabra. Ovarium ovodeum cum stylo brevissimo  $2\frac{1}{2}$  mm. longum  $1\frac{2}{3}$  mm. latum glabrum apice stylo conico  $\frac{1}{3}$  mm. longo apiculatum, stylo apice acuto obscure 3-lobato, stigmate inconspicuo; ovarium 3-loculare, loculis 2-ovulatis.

HAB. Arisan, 2500 m., leg. U. FAURIE, Jun. 1914, (No. 309).

*Rohdea* ROTH.

**Rohdea Watanabei** HAYATA (XVI.) Ic. Pl. Formos. V. p. 236.

*Lilium* LINN.

**Lilium Kanashiroi** HAYATA sp. nov. Caulis simplex gracilis erectus 30 cm. longus teres  $1\frac{1}{2}$  mm. in diametro sectionis glaber toto foliifer. Folia linearia lineari-lanceolata 6 cm. longa 2 mm. lata apice acuta vel obtusa basi deorsum attenuata ad basin subito dilatata sessilia chartacea, costa supra tenuiter impressa subtus tenuiter elevata. Flores ad apicem caulis solitarii terminales et generaliter cernui flavi. Segmenta (perianthii) a medio sursum retrorse reflexa patentia flava, exteriora 3 ☉-forme reflexa lineari-spathulata cum unguibus 4 cm. longa deorsum unguiformia, unguibus  $1\frac{1}{2}$  cm. longis 3 mm. latis erectis margine interiore recurvis extus lævibus intus deorsum 2-striatim hirsutis, laminis linearibus  $2\frac{1}{2}$  cm. longis 6 mm. latis planis exteriori recurvis margine integra planis apice obtusis pilis claviformibus dense obtectis infra apicem extus callis singulis instructis intus infra apicem leviter concavis utraque pagine glabris haud costatis, nervulis parallelis undulatis; 3-interiora cum unguibus spathulata 4 cm. longa, unguibus  $1\frac{1}{2}$  cm. longis apice gradatim ad laminam abeuntibus intus 2-striatim hirsutis extus glabris carinatis carinis ad laminam abeuntibus, lamina lineari  $2\frac{1}{2}$  cm. longa 8 mm. lata apice emarginata vel breve 2-lobata apice in ambitu truncata margine integra sursum minute ciliolata sursum pilosiuscula, extus medio

prominente carinata intus haud carinata. Stamina 6, filamentis linearibus 22 mm. longis 1 mm. latis 1-nervatis complanatis apice subulato-acuminatis glabris, antheris flavis 8 mm. longis  $1\frac{1}{2}$  mm. latis utrinque emarginatis versatilibus. Ovarium cylindricum 14 mm. longum 2 mm. latum apice 6-lobulatum glabrum, stylo columnari 1 cm. longo glabro acute triquetro apice plus minus dilatato, stigmate 2-fido, segmentis patentibus semi-rotundatis 3 mm. longisque latis apice obtusis.

HAB. Loo-choo, leg. S. KANASHIRO, No. 340, fl. flavo.

The present lily was previously identified with the Japanese *L. callosum* S. et Z. The latter is however limited to the southern part of Japan, while this new species is found only in the Loo-choo islands. The difference between the two species is, besides many others, observed in the color of the flowers. The perianth of *L. callosum* is reddish, while *L. Kanashiroi* is yellowish. The callosities at the apex of the leaves of the former can never be seen in the latter.

**Lilium talanense** HAYATA sp. nov. (Fig. 21). Pseudobulbi depressovati vel depresso-rotundati  $2\frac{1}{2}$  cm. longi 3 cm. lati, squamis carnosis ovatis apice abrupte acutis, radicibus fibrosis e basi pseudobulbi oriundis. Caulis 20-30 cm. longus erectus rectus gracilis 2 mm. in diametro a basi usque ad medium foliifer. Folia linearia 5 mm. longa apice acuminata basi latissima 2-3 mm. lata glabra, costa supra impressa subtus tenuiter elevata, sessilia, superiora minora squamiformia. Flores ad apicem caulis terminales suberecti solitarii, interdum floribus 1-2 racemosum dispositis, pedunculis bracteis minoribus 2-3 remote alternatimque instructis, bracteis linearibus 5 mm. longis 1 mm. latis apice truncatis interiore recurvis callosis. Flores rubescentes 3 cm. in diametro. Segmenta, exteriora 3 lineari-spathulata  $4\frac{1}{2}$  cm. longa 6 mm. lata, apice calloso-obtusa concava plus minus cristata basi unguiforme attenuata utraque glabra, interiora paullo latiora 8 mm. lata apice obtusa haud cristata dorso prominente distincteque carinata basi unguiculata attenuata. Stamina 6, filamentis filiformibus complanatis 1-nerviis glabris  $2\frac{1}{2}$  cm. longis apice subulatis pallido-rubris, antheris rubris versatilibus linearibus 7 mm. longis. Ovarium clavato-prismatico-cylindricum 17 mm. longum 3 mm. latum apice truncatum basi attenuatum viride glabrum, stylo columnari 10 mm. longo clavato-triquetro





Fig. 21, *Lilium tulanense* HAYATA.  
(After a water-colour drawing by Mrs. T. KAWAKAMI.)

glabro, stigmatè terminali globoso 3–4 mm. lato basi 3-lobato fulvo.

HAB. Shintikuchō : Talang, Taiheitō, ad 1900 ped. alt., leg. S. YAMADA, Aug. 1914.

Near *Lilium callosum* S. et Z., but differs from it in the perianth-segments which are scarlet on the upper surface but light red on the back. The segments of *L. callosum* are usually purple on the back.

## Juncaceæ.

### *Juncus* LINN.

***Juncus leptocladus*** HAYATA sp. nov. Annua. Caulis tenuissimus glaber scandentissimus ramosissimus 26 cm. longus subteres gracillimus. Folia radicalia linearia circ. 12 cm. longa 1 mm. lata apice acuminata basi plus minus vaginata dorso complanata glaberrima margine interiore tenuissime recurva erecta tenuissima herbacea, vaginis 2–3 cm. longis latere uno fissis margine membranaceis. Flores laxissime cymosi breve vel longe pedicellati basi bracteis 2 instructi, bracteis triangulari-ovatis apice acutis hyalinis 2 mm. longis 1½ mm. latis glabris haud costatis haud nervosis. Perianthii segmenta exteriora 3 lanceolato-linearia 6½ mm. longa ⅔ mm. lata apice acuminata glabra late 1-costata margine hyalina, segmenta interiora lineari-lanceolata 4 mm. longa ⅔ mm. lata apice acuminata late 1-costata margine hyalina glabra. Stamina 6, filamentis filiformibus 1 mm. longis glabris basi se brevissime connatis, antheris linearibus 1 mm. longis ⅓ mm. latis utrinque obtusis. Ovarium glabrum lineari-ovoideum circ. 1 mm. longum ⅓ mm. latum apice ad stylum ½ mm. longum abeuns tri-sulcatum trigonum, stigmatibus 3-fidis.

HAB. Arisan, ad 8000 ped. alt., leg. U. FAURIE, Junio 1914.

Somewhat near *Juncus bufonius* LINN., but widely different from it in having far much longer perianth.

## Aroideæ.

### *Arisæma* MART.

***Arisæma arisanensis*** HAYATA sp. nov. Tuber depresso-globosum 2 cm. longum 3 cm. latum, radicibus a facie superiore tuberis oriundis teretibus. Caulis cum spadice 30 cm. longus glaber basi 13 mm. latus 1–2-vaginis instructus

2-foliatus. Folia 2 subopposita basi vaginata longe petiolata, petiolis vagina excepta 15 cm. longis glabris teretibus erectis, lamina tripartita 3-foliolata, foliolis sessilibus, foliolo terminali ovato-lanceolato 12 cm longo 4 cm. lato apice recto-acuminato (acumine lineari versus apicem filiformi, partibus filiformibus  $1\frac{1}{2}$  cm. longis) basi subito cuneato margine subintegro membranaceo utraque pagine pubescenti, venis lateralibus tenuissimis, foliolis lateralibus foliolo terminali æquilongis æquilatis sed valde obliquis latere inferiore basi rotundatis vel obtusissimis latere superiore basi acuminatis sessilibus. Spadix terminalis, pedunculo 6 cm. longo 3–4 mm. lato apice gradatim dilatato ad spatham abeunti. Spatha clavato-cylindrica 9–10 cm. longa, tubo 5 cm. longo 2 cm. lato latere uno fisso, limbo saccato-fornicato verticaliter late multi-striato, striis viridibus 2–3 mm. latis, tenuiter pubescenti. Spadix ♂ columniformis 6 cm. longus basi florifer; partibus floriferis cylindricis 13 mm. longis 6 mm. latis densiuscule floriferis; appendice  $4\frac{1}{2}$  cm. longa basi cylindrica, partibus inferioribus appendicis cylindricis 6–7 mm. longis 4 mm. latis, partibus supra partem cylindricam subito dilatatis 8 mm. latis sursum gradatim angustioribus apice obtusis. Fl. ♂: stamen 1, subsessile; anthera 2-locularis, loculis globosis approximatis  $\frac{1}{2}$  mm. in diametro.

HAB. Arisan, 2500 m. alt., leg. U. FAURIE, Junio. 1914.

Resembles *Arisema ringens* in having trifoliate leaves and fornicate spathas, and in the spadix; but distinguishable from it in having much smaller hairy leaflets with a filiformed tip and in the spadix which is more or less attenuate towards the apex.

*Amorphophallus* BLUME.

**Amorphophallus** (*Candarium*) **gigantiflorus** HAYATA sp. nov. (Fig. 22). Bulbus depresso-globosus vel semi-globosus 15 cm. longus 22 cm. latus basi rotundatus apice latissimus ad centrum valde depressus e centro scapum emittens facie cicatricibus radicis tuberculatus, radicibus incrassato-filiformibus 20–30 cm. longis  $2\frac{1}{2}$  mm. in diametro simplicibus haud ramosis. Scapus cum spadice circ. 45 cm. longus e centro summi bulbi oriundus spadice excepto 7 cm. longus  $3\frac{1}{2}$  cm. crassus rugosus basi bracteis duabus involutus, bractea inferiore triangulari-oblonga 20 cm. longa 10 cm. lata apice obtusa vel apiculata coriacea minute-nervosa intus concava margine interiore recurvata basin

scapi amplexant, bractea superiore longiore 31 cm. longa 12 cm. lata obovato-oblonga basin scapi amplexant intus concava minute nervosa. Spatha in statu obconico-campulata 30 cm. longa sursum 40 cm. in diametro, latere uno fissâ spadice sinestro obtegens in explicato fere rotundata 40-50 cm. in diametro apice obscure triangulari-obtusâ margine plicato-undulata, exta glabra lævis purpureo-viridescens albo-maculata (maculis rotundatis 6 mm. in diametro) usque ad prope 18 cm. altitudinem plus purpurea versus apicem plus viridescens, intus prope marginem lævis, partibus infra-marginalibus 7 cm. latis intus rugulosis viridescens, partibus mediis 7 cm. latis intus lævibus albis, partibus inferioribus intus a basi usque ad 12 cm. altitudinem atro-purpureis densissime verrucoso-tuberculatis, (tuberculis setuloso-coniformibus circ. 2 mm. longis fulvis), prope latere uno lævis. Spadix in ambitu claviformis 38 cm. latus sessilis, partibus ovariferis inferioribus 13 cm. longis cum pistillis 8 cm. latis cylindricis ovario excepto 5 cm. latis dense ovariferis; partibus staminiferis superioribus obconicis cum staminibus 7 cm. longis 10 cm. latis basi 5 cm. latis apice 10 cm. latis densissime staminiferis;



Fig. 22, *Amorphophallus gigantiflorus* HAYATA.

partibus inferioribus intus a basi usque ad 12 cm. altitudinem atro-purpureis densissime verrucoso-tuberculatis, (tuberculis setuloso-coniformibus circ. 2 mm. longis fulvis), prope latere uno lævis. Spadix in ambitu claviformis 38 cm. latus sessilis, partibus ovariferis inferioribus 13 cm. longis cum pistillis 8 cm. latis cylindricis ovario excepto 5 cm. latis dense ovariferis; partibus staminiferis superioribus obconicis cum staminibus 7 cm. longis 10 cm. latis basi 5 cm. latis apice 10 cm. latis densissime staminiferis;

appendice depresso-conico-globosa 6 cm. longa 19–20 cm. lata ad summum rotundata atro-purpurea cava hac atque illac grosse rugosa vel levi toto minute tenuissime verrucosa. Fl. ♂: densissime dispositi, stamine 1; anthera sessilis transverse insita lineari-rectangulari flavescent 4–5 mm. longa 2–3 mm. lata apice truncata levis, loculis adnatis linearibus crassis. Fl. ♀: pistillum densiuscule dispositum transverse insitum. Ovarium valde depresso-globosum glabrum leviter purpurascens 3 mm. longum 5 mm. latum leve 3-loculare, parietibus crassissimis, loculis parvis, ovulis solitariis loculum complete occupantibus; stylo columnari 1 cm. longo glabro leviter purpurascenti, stigmate terminali 3-lobato cineraceo.

HAB. Tainanchō: Kareikōshō, Takunansha, leg. S. YŪKI, Mai. 1914, fl.

Near *Amorphophallus campanulatus* BLUME (ENGL. Arac. in ENGL. PRANTL Nat. Pfl.-fam. II-3, p. 127, fig. 81).

## Cyperaceæ.

### *Cyperus* LINN.

#### *Key to the Formosan Species.*

(Principally following to C. B. CLARKE in HOOK. f. Fl. Brit.

Ind. VI. pp. 597–619).

I. Inflorescence umbellate throughout or capitate; spikelets digitate or clustered, not spicate. Style-branches linear, rarely linear-lanceolate.

Very small slender annual, umbels nearly head-like, very rarely reduced to a single head. Spikelets small. Glumes mucronate.... *C. uncinatus*.

Small or middle-sized, annuals or perennials; rhizome 0, or in *C. Haspan* creeping. Leaves and branches moderately long, narrow, weak. Inflorescence umbellate. Glumes scarcely cuspidate.

Nut pale brown subequally trigonous ..... *C. difformis*.

Nut pale brown ovoid  $\frac{1}{3}$ – $\frac{1}{2}$  length of obtuse glume..... *C. Haspan*.

Nut marble-white plano-convex (plane face against rhachilla) .....

*C. flavidus*.

Tall perennial with green somewhat broad (broadest in the genus) often 3-nerved leaves. Umbels compound ..... *C. diffusus*.

II. Inflorescence umbellate; spikes often more or less corymbed; spikelets (sometimes very shortly) spicate. Style-branches linear.



Series A. Rhachilla of spikelets not much winged. Leaves and bracts long (except in *C. malaccensis*).

Annuals, or sometimes flowering the second year.

Spikelets oblong or oblong-linear 12–25 mm. long 3 mm.–6 mm.

broad ..... *C. compress.*

Spikelets linear 8 mm.–13 mm. long  $1\frac{1}{2}$  mm. broad ..... *C. Iria.*

Rhizome becoming woody, elongate stolons frequent. Large (or middle-sized).

Spikelets very narrow nearly filiformed 1– $\frac{1}{2}$  mm. broad.

Leaves usually few, topmost erect short green, sword-shaped, shortly caudate ..... *C. malaccensis.*

Leaves many, topmost spreading, long, much exceeding inflorescence. .... *C. distans, C. nutans, C. eleusinoides.*

(Note: I can not satisfactorily distinguish these three species one from another).

Spikelets much broader oblong or linear never filiformed  $1\frac{1}{2}$ –3 mm. broad.

Spikelets broadly linear nearly 2 cm. long 2–3 mm. broad...  
..... *C. procerus.*

Spikelets oblong or linear narrower and shorter, not exceeding 8 mm. in length.

Glumes not imbricate, rhachilla hairy ..... *C. pilosus.*

Glumes densely imbricate, rhachilla glabrous.

Nut oblong  $\frac{2}{3}$  mm. long ..... *C. densespicaus.*

Nut elongately oblong nearly 1 mm. long .....  
..... *C. mediorubra.*

Series B. Rhachilla of spikelets (usually conspicuously) winged.

Tall. Stolons long, hardening into creeping rhizomes. Leaves short, rarely  $\frac{1}{2}$  length of stem. Glumes approximate, closely imbricate..  
..... *C. tegetiformis.*

Tall. Rhizome very short, woody; stolons 0, i. e. lateral shoots from base of stem immediately ascending. Glumes scarcely imbricate in fruit..... *C. Zollingeri.*

Tall or medium plants, stoloniferous or rhizome woody. Leaves and

bracts long. Rhachilla of spikelets winged. Glumes closely imbricate.

Stem at the base nodosely thickened suddenly constricted into a long rhizome.... *C. rotundus*.

Rhizome woody long-creeping, stem at top trigonous at base nodose..... *C. stolonifer*.

Stolons elongate rather slender, stem tall at base bulbous woody ; ..... *C. tuberosus*.

Tall. Stolons 0. Leaves and bracts long. Umbel large compound spikes and spikelets many. Rhachilla of spikelets conspicuously winged. Anthers apiculate, not rarely crested, style (with its 3 branches) small. Nut small, ashy black.

Spikes digitate scarcely peduncled long-cylindric dense, spikelets linear 12-30-fl., glumes closely imbricate, wings of rhachilla oblong persistent, anthers short-oblong not crested ..... *C. radiatus*.

Spikes (some) peduncled long cylindric, spikelets very many linear 8-20-fl., glumes closely imbricate, wings of rhachilla oblong persistent, anthers oblong not crested.... *C. exaltatus*.

Umbel large compound, rays divaricate, spikes cylindric, spikelets very many linear 6-40-fl., wings of rhachilla lanceolate yellow soon deciduous, anthers linear-oblong scarcely crested, nut oblong-obovoid  $\frac{1}{2}$  length of glume..... *C. digitatus*.

**Cyperus procerus** ROTTB.; C. B. CLARKE in HOOK f. Fl. Brit. Ind.

VI. p. 610; HEMSL. Ind. Fl. Sin. III. p. 215.

HAB. Hokuto, leg. T. SÔMA, Nov. 1914.

**Cyperus dense-spicatus** HAYATA sp. nov. (Fig. 23-a-d). Caulis haud ramosus circ. 1 m. altus acute triquet̄r glaber erectus. Folia pauca linearia cum vaginis 60 cm. longa, laminis 7 mm. latis apice acuminatis margine integris haud scabris; foliis caulinis nullis, bracteis basi inflorescentiæ insitis foliiformibus 40-50 cm. longis 6 mm. latis inflorescentiam in longitudine multo excedentibus glabris patentissimis. Inflorescentia duplicato-umbellata sessilis 10 cm. longa 15 cm. in diametro, radiis circ. 10 patentibus 10 cm. longis rectis simplicibus vel apice umbelluliferis, umbellulis sessilibus circ. 5-radiatis,

radiis 2–3 cm. longis a basi usque ad apicem densissime spiculiferis. Spiculæ lineares 7 mm. longæ 2 mm. latæ; squamis infima persistenti excepta caducissimis, mediis rotundatis  $1\frac{1}{2}$  mm. longis  $1\frac{1}{3}$  mm. latis dorso subcarinatis apice ad cuspedem brevem abeuntibus subplicatis nuculam amplexantibus. Nucula oblonga  $\frac{1}{2}$  mm. longa  $\frac{1}{3}$  mm. lata lævis apice basique obtusa facie plana dorso convexa subtrigona; stylus 3-fidus.

HAB. in paludosis Maruyama, leg. U. FAURIE, Mai. 1903, (No. 790).

Near *Cyperus pilosus* VAHL., but differs from it by the very much densely spicate and much shorter spikelets.

***Cyperus mediorubescens* HAYATA sp. nov.** (Fig. 23, e–g). Folia radicalia ignota. Caulis acute triquetus circ. 80 cm. altus glaber basi usque ad inflorescentiam simplex cramosus, bracteis manifestis 6 basi inflorescentiæ insitis; bracteis inæquilongis longioribus circ. 40 cm. longis 5–6 mm. latis apice acuminatis inflorescentiam in longitudine 5–6-plo æquantibus. Inflorescentia umbelliformis sessilis, radiis circ. 10 simplicibus vel apice umbelluliferis inæquilongis 4–10 cm. longis glabris, umbellulis (i.e. spicis spicularum) circ. 5–radiatis 2–5 cm. longis patentibus a basi usque ad apicem densissime spiculiferis. Spicæ (i.e. radii umbellularum) 2–5 cm.

longæ 1 cm. latæ sessiles densissime spiculiferæ, bracteolis basi spiculæ sitis singulis. Spiculæ lineares rectæ 6 mm. longæ  $1\frac{1}{2}$ –2 mm. latæ apice basique obtusæ floribus utroque latere 10–12; squamis (glumis) mediis  $1\frac{1}{2}$  mm. longis apice cuspidatis castaneis. Achænium oblongum utrinque obtusum  $\frac{2}{3}$  mm. longum læve subtrigonum dorso plus minus compressum plano-convexum dorso convexum facie planum; styli 3-fidi. Rhachilla latere compressa haud alata.

HAB. Akō: Sekisanshō, leg. G. NAKAHARA, Sept. 1905.

Near *Cyperus pilosus* VAHL., but different from it by the very much densely spicate, much shorter spikelets.

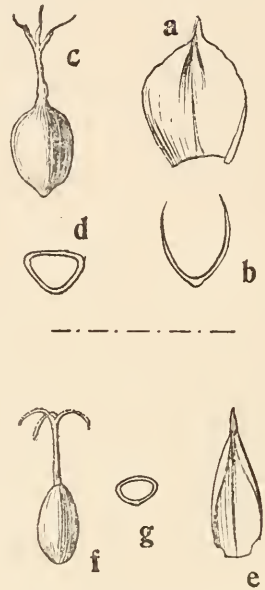


Fig. 23, a–d, *Cyperus densesplicatus* HAYATA; a, a scale; b, the same in section; c, a nutlet; d, the same in section. e–g, *Cyperus mediorubescens* HAYATA; e, a scale; f, a nutlet; g, the same, in section.

*Eleocharis* R. BR.

***Eleocharis acicularis*** R. BROWN; MATSUM. et HAYATA Enum. Pl. Formos. p. 480.

HAB. Taihoku: Koteishō, leg. Y. SHIMADA, Juli. 1914.

***Eleocharis fistulosa*** LINK in HOOK. f. Fl. Brit. Ind. VI. p. 626.

HAB. Tōyēn, leg. S. SASAKI, Nov. 1910.

***Eleocharis capitata*** R. BR.; HOOK. f. Fl. Brit. Ind. VI. p. 627; MATSUM. et HAYATA Enum. Pl. Formos. p. 480.

HAB. Akō, leg. T. SŌMA, Mai. 1915.

“Roots fibrous, stems somewhat slender, spikelets small dense obtuse, bristles as long as nut retrorsely scabrous brown or ferruginous, nut black smooth, style 2-fid base small depressed pale”. “Stems 2–14 in. Spikelets  $\frac{1}{8}$ – $\frac{1}{2}$  in. pale. Bristles 7, or fewer. Nut as long as  $\frac{2}{3}$  glume, compressed, obovoid.”

***Eleocharis*** (*Eu-eleocharis*—*Leiocarpiceæ*) ***Shimadai*** HAYATA sp. nov. (Fig. 24). Annuā. Caulis ciliatus 15–30 cm. longus  $\frac{1}{2}$  mm. latus erectus

rectus glaber teres basi vaginis singulis instructus, vaginis 3 mm. longis tubulosis  $\frac{1}{2}$  mm. latis haud fissis ore subtruncatis apice triangulari-acutis. Spicula solitaria terminalis oblonga cylindrica 7 mm.–20 mm. longa  $2\frac{1}{2}$ –4 mm. lata apice acuta basi obtusa basi bracteis persistentibus singulis instructa, bracteis oblongis apice obtusissimis basi

spiculam semiamplectantibus hyalinis; squamis mediis rhomboideo-obovatis valde concavis  $2\frac{1}{2}$  mm. longis  $1\frac{1}{2}$  mm. latis apice obtusissimis basi subtruncatis. Setæ 6 achænium in longitudine duplo æquantes filiformes retrorse scabræ. Achænium flavum obovoideum 1 mm. longum  $\frac{1}{2}$  mm. latum læve dorso costato-angulatum facie planum in sectione triangulare apice obtusissimum basi angustatum, stylo basi valde dilatato, partibus dilatatis conicis apicem achæniî mitraforme obtectis.

HAB. Hokuto, leg. Y. SHIMADA, (No. 14, typus) Oct. 1914; Daiburin,

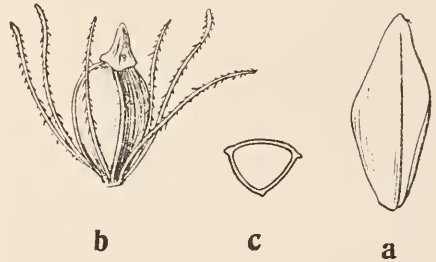


Fig. 24, *Eleocharis Shimadai* HAYATA; a, a scale; b, a nutlet with setæ; c, the same in section.

leg. Y. SHIMADA, Mart. 1908, (No. 4320); Taikokan, leg. T. SōMA, 1912, Oct.

Near *E. afflata* STEUD, but differs from it by the much longer bristles which are as long as  $\frac{3}{2}$  nuts. In *E. afflata* and *E. japonica*, the bristles are hardly visible from without, but in this new species, they are very conspicuous, and exerted beyond the glumes.

***Fimbristylis* VAHL.**

***Fimbristylis* (Sect. *Dichelostylis*) *aginkotensis* HAYATA sp. nov.** (Fig. 25). Tenuissima dense cæspitosa 30–15 cm. alta. Folia basi caulis sita quam caulis multo breviora 8 cm. longa filiformia erecto-recurvata basi vaginata, vaginis  $1\frac{1}{2}$ –4 cm. longis 1 mm. latis tubuliformibus ore obliquis, laminis filiformibus 3–10 cm. longis in plicato  $\frac{3}{4}$ – $\frac{1}{4}$  mm. latis margine interiore recurvo-plicatis igitur teretibus gracillimis glabris. Scapi foliis duplo longiores 10–30 cm. longi  $\frac{1}{2}$  mm. lati gracillimi teretes vel plus minus complanati glabri apice spiculam singulam gerentes et apice ad bracteas abeuntes, bracteis singulis vel duabus 5–7 mm. longis linearibus apice obtusis  $\frac{1}{2}$  mm. latis spicas excedentibus basi dilatatis. Spicula ovoidea 7–8 mm. longa 3 mm. lata apice obtusa basi rotundata, squamis mediis late oblongis 3 mm. longis  $2\frac{1}{2}$  mm. latis apice breve acutis dorso ad setulam brevissimam productis. Nuculæ obovatæ  $1\frac{1}{3}$  mm. longæ  $\frac{4}{5}$  mm. latæ læves biconvexæ dorso plus facie minus convexæ apice subtruncatæ basi triangulari-acutæ flavo-fulvescentes; styli 2 mm. longi basi dilatati sursum sub ramificatione dense barbati deorsum prope basin glabri apice 2-fidi, ramis recurvis.

HAB. Agincort, leg. T. KAWAKAMI, 1907, Sept.

Near *E. ferruginea* VAHL, but differs from it by the much more dilated conical base of the styles and in the inconspicuously tessellate nuts.

***Fimbristylis* (Sect. *Dichelostylis*) *anpinensis* HAYATA sp. nov.** (Fig. 26). Planta dense cæspitosa basi densissime radicefera radicibus fibrillatis. Caulis gracilis 60–40 cm. longus glaber teres subrectus vel plus minus recurvus basi squamis

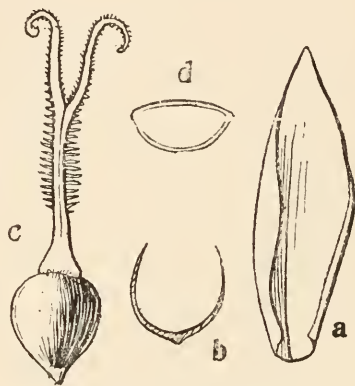



FIG. 25, *Fimbristylis aginkotensis* HAYATA; a, a scale; b, the same, in section; c, a nutlet with style; d, the same, in section.



et foliis instructus basi sursum ciliatus inflorescentis exceptis haud ramosus, squamis infimis triangularibus minutis interioribus gradatim elongatis longioribus ad folium abeuntibus. Folia subacerosa recta erecta glabra cum vaginis 10–20 cm. longa, vaginis quam lamina duplo longioribus 2 mm. latis apice transverse vel plus minus oblique truncatis latere dorsali excepto tenuissime membranaceis hyalinis, laminis acerosis apice acutis vel obtusis margine plus minus plicato-recurvis in sectione -formibus glabris in explicato 1 mm. vel minus quam 1 mm. latis. Cymæ subumbellatæ vel corymbosæ, (radiis vel ramis 5–8, 1–6 cm. longis laxè et paucè 1–5 spiculiferis), basi bracteis 4–5 suffultis, bracteis foliiformibus basi gradatim dilatatis basin cymæ amplexantibus 1–5 cm. longis nunquam ramos inflorescentiæ superantibus.

Spicula lineari-oblonga 1 cm. longa 3–4 mm. lata apice acuta basi obtusa; squamis mediis ovato-oblongis  $4\frac{1}{2}$  mm. longis  $2\frac{1}{2}$  mm. latis apice acutis obscure 1-costatis integris. Nucula obovata  $1\frac{1}{2}$  mm. longa  $\frac{4}{5}$  mm. lata apice truncato-rotundata basi cuneato-attenuata lævis facie minus dorso plus convexa. Styli  $4\frac{1}{2}$  mm. longi apice 2-fidi (ramis glabris filiformibus  $1\frac{1}{2}$  mm. longis recurvis) basi haud dilatati glabri supra basin usque ad ramificationem barbati.

HAB. Anpin, leg. TAKAGI, Oct. 1914.

Near *P. ferruginea*, but separable from it by the perfectly smooth nutlets.

**Fimbristylis** (sect. *Dichelostylis*) **boninensis** HAYATA sp. nov. (Fig. 27).

Planta caespitosa ascendens. Caulis (vel scapus) 20–50 cm. longus erectus rectus valde complanatus (ut videtur) glaber in exsiccatò multo-sulcato-striatus 2 mm.– $2\frac{1}{2}$  mm. latus apice capitatim spiciger basi squamis et foliis suffultus, squamis exterioribus ovatis, interioribus gradatim elongatis ad folium abeuntibus. Folia

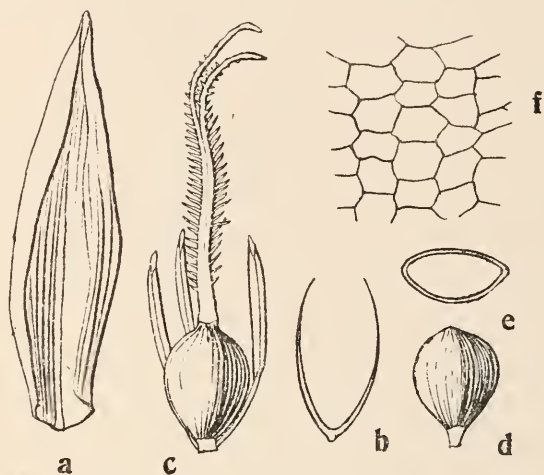


FIG. 26, *Fimbristylis anpinensis* HAYATA; a, a scale; b, the same in section; c, an ovary with the style and stamens; d, a nutlet; e, the same in section; f, cellular structure of the outer coat of the nutlet.

coriacea ad basin caulis conferta cum vaginis 7–35 cm. longa 5–2½ mm. lata linearia erecta vel recurva glabra, vaginis 3–10 cm. longis cylindricis latere interiore tenuissime membranaceis hyalinis ore oblique truncatis minute hirsutis, laminis glabris coriaceis margine sub lente minute serrulatis margine exteriori leviter recurvis. Capitula spicularum globosa singulariter vel geminatim sita 2 cm. in diametro basi bracteis 2 instructa, bracteis 2–4 cm. longis foliiformibus horizontaliter divaricatis. Spicula dense 10–20 congesta ovoideo-fusiformis 8–12

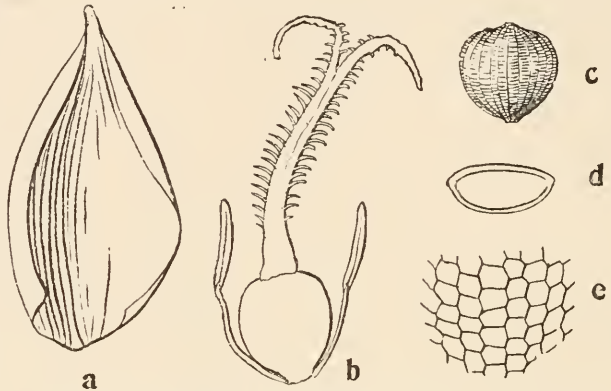


Fig. 27, *Fimbristylis boninensis* HAYATA; a, a scale; b, an ovary with the style and stamens; c, a nutlet; d, the same in section; e, cellular structure of the outer coat of the nutlet.

mm. longa 3–5 mm. lata apice acuta basi obtusa, squamis mediis ovato-triangularibus 3½ mm. longis totiusque latis apice breve cuspidato-acutis 1-costatis integris. Nucula obtriangulari-obovoidea 1½ mm. longa 1 mm. lata vel minus lata apice truncata ad centrum breve apiculata basi obtusa vel cuneato-obtusa longitudinaliter tessellata dorso plus facie minus convexa subplanoconvexa. Styli 3 mm. longi lineares ¼ mm. lati apice 2-fidi, ramis recurvis, basi haud vel vix dilatati apicem nuculae obtegentes medio sursum usque ad ramificationem dense barbati basi cum ramis glabri.

HAB. Bonin: Chichizima, leg. H. HATTORI, Sept. 1905.

Comparable to some extent to *F. sericea*, but greatly different from it by the very much longer glabrous leaves.

**Fimbristylis** (Sect. *Eleocharioides*) **kagiensis** HAYATA sp. nov. Annuua? caespitosa 10–15 cm. alta. Caulis (vel scapus) 8–15 cm. longus basi squamis foliis suffultus. Folia cum vaginis 6–15 cm. longa quam caulis longiora vel breviora suberecta vel ascenduntia lineari-filiformia vel acerosa glabra, vaginis 1½ cm. longis laminam ½–⅓-plo aequantibus tubiformibus latere interiore tenuissime membranaceis, ore obliquo utraque latere auriculis rotundato-triangularibus

instructo ad insertionem laminæ breve ciliato, lamina 4–10 cm. longa margine interiore plicato-recurva in explicato 1 mm. lata margine glabra sed versus apicem breve serrulata ad apicem obtusa. Spicula terminalis solitaria ovoideoglobosa vel elongato-ovoidea 6–7 mm. longa 3 mm. lata basi bracteis singulis vel duabus instructa, bracteis minutis cuspidato-triangularibus 3 mm. longis basi  $1\frac{1}{2}$  mm. latis caducissimis glabris margine hyalinis tenuissimis medio tri-nerviis. Squamæ valde concavæ glabræ 3 mm. longæ in explicato 3–4 mm. latæ rotundatæ brevissime mucronatæ basi truncatæ multinerviæ dorso medio castaneæ versus basin margineque hyalinæ ecoloratæ. Nuculæ biconvexæ  $1\frac{1}{2}$  mm. longæ 1 mm. latæ apice fere rotundatæ basi plus minus cuneato-angustatæ fulvo-pallidæ, stylis plus minus exsertis 2 mm. longis basi plus minus incrassatis sursum barbatis apice 2-fidis, ramis gracillimis desuper recurvis haud barbatis rubro-ferrugineis.

HAB. Kagi, leg. T. SÔMA, Sept. 1914.

Near *F. polytrichoides* VAHL, but differs from it in having whitish nutlets with the barbate styles.

**Fimbristylis** (Sect. *Trichlostylis*) **kankaensis** HAYATA sp. nov. (Fig. 28). Rhizoma subrectum ramosum, radicibus et reliquis foliorum dense obtectum apice ad caulem abeuns.

Folia glabra basi caulis densissime fasciculata patentissima cum vaginis 4–5 cm. longa, vaginis valde dilatatis 13 mm. longis latissimis cum iis alteris connatis tenuibus, laminis linearibus basi latissimis sursum gradatim angustioribus basi 3– $3\frac{1}{2}$  mm. longis crasse coriaceis valde rigidis supra concavis subtus convexis margine sub lente minute

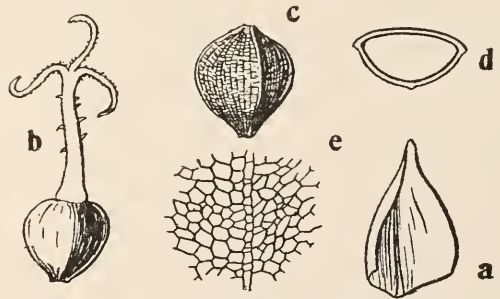


Fig. 28, *Fimbristylis kankaensis* HAYATA; a, a scale; b, an ovary with the style; c, a nutlet; d, the same in section; e, cellular structure of the outer coat of the nutlet, dorsal angle seen from front.

duplicato-serrulatis sursum subintegris apice obtusissimis. Scapi 10–18 cm. longi erecti recti graciles complanati (semper?)  $\frac{2}{3}$  mm. lati glabri plus minus sulcati a centro fasciculorum foliorum basilarium oriundi basi squamis linearilanceolatis 3–4 instructi versus apicem cymosi 2–4 ramosi, ramis inæqualibus

minus quam 2 cm. longis ad apices spiculas capitulatim gerentibus. Spiculæ ad apicem ramulorum capitatim 4-5 sitæ rotundato-ovatæ 4-5 mm. longæ 3 mm. latæ apice obtusissimæ basi rotundatæ, squamis infimis (i.e. bracteolis?) sterilibus ovato-triangularibus apice acutis 2 mm. longis; squamis mediis ovato-triangularibus 2 mm. longis  $1\frac{1}{2}$  mm. latis apice obtusis dorso prominente carinatis. Nuculæ depresso-obovatæ  $\frac{2}{3}$  mm. longæ totiusque latæ apice truncatæ basi acutæ sub lente minute tuberculatæ sursum fusco-fulvescentes deorsum flavo-fulvescentes vel maturo fusco-rubescens dorso valde convexæ vel angulato-convexæ facie subplanæ in sectione plano-convexæ vel subtrigonæ; styli  $1\frac{1}{2}$  mm. longi 3-fidi subglabri.

HAB. Kankao, leg. B. HAYATA, Juli. 1914.

Comparable to some extent to *F. junciformis* KUNTH, but greatly different from it in having dark brown nuts with quite glabrous styles.

**Fimbristylis** (Sect. *Elcocharioides*) **takaensis** HAYATA sp. nov. (Fig. 29). Rhizoma ramosum fere erectum dense radiciferum. Caulis cæspitosus gracillimus circ. 20 cm. longus teres vel subcomplanatus  $\frac{1}{2}$  mm. latus vel latior erectus apice plus minus recurvus apice ad bracteas singulas productus, bracteis interdum obsoletis filiformibus erectis spicam exceedentibus 1- $1\frac{1}{2}$  cm. longis. Folia ad basin caulis sita pauca 1-3 cum vaginis 10-15 cm. longis filiformia erecta, vaginis 2-3 cm. longis 1 mm. latis tubuliformibus ore obliquissimis glabris, auriculis late triangularibus  $\frac{1}{2}$  mm. longis  $\frac{2}{3}$  mm. latis, laminis 5-6 cm. longis in plicato latere complanatis  $\frac{1}{3}$  mm. latis apice acutis<sup>s</sup> margine integris prope apicem pauce minute obscure setuloso-serrulatis. Spicula solitaria cylindrico-ovata circ. 1 cm. longa 3 mm. lata utrinque obtusa basi bracteis deciduis singulis instructa; squamis mediis oblongo-linearibus 3- $3\frac{1}{2}$  mm. longis 1 mm. latis apice obtusis vel triangulari-obtusis obtusissimis vel truncatis sursum castaneo-fulvescentibus medio margine basique cecoloratis. Achænium

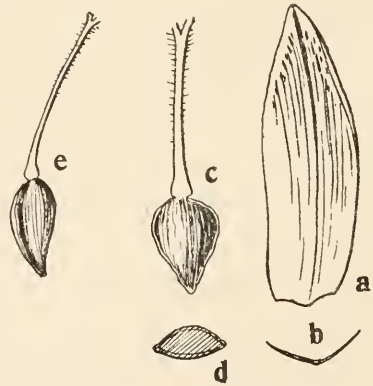


Fig. 29, *Fimbristylis takaensis* HAYATA; a, a scale; b, section of the same; c, a nutlet with the style; e, the same, seen from side; d, section of the same.



(maturum) obovatum 1 mm. longum  $\frac{3}{4}$  mm. latum facie subplanum dorso convexum in sectione sursum plano-convexum deorsum rhomboideum dorso facieque tuberculis minutis notatum apice obtuso-truncatum basi cuneato-acutum; stylus gracilis  $2\frac{1}{2}$  mm. longus apice supra squamam exsertus supra medium pilosus supra medium 2-fidus, (ramis 1 mm. longis gracilibus recurvis), basi leviter dilatatus vel haud dilatatus glaber.

HAB. Takao, leg. Y. SHIMADA, Mai. 1915.

Near *F. polytrichoides* VAHL, but differs from it by the much larger spikelets and nuts which are as long as  $\frac{1}{3}$  glume with much longer styles than nuts.

**Fimbristylis** (Sect. *Dichelostylis*) **tikushiensis** HAYATA sp. nov. (Fig. 30). Planta plus minus cæspitosa. Caulis cum inflorescentiis 40–80 cm. longus brevissime hirsutus vel subglabratus teres in exsiccatu multo-sulcatus basi sursum usque ad inflorescentiam haud ramosus erectus rectus basi squamis et foliis suffultus, squamis exterioribus ad folium abeuntibus. Folia basi caulis conferta erecta vel recurva linearia 30–40 longa 3–4 mm. lata apice obtusa basi vaginata supra

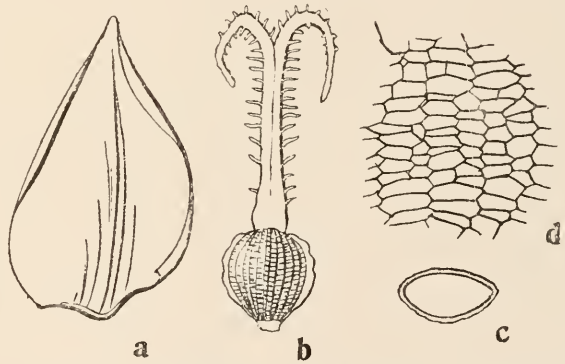


FIG. 30, *Fimbristylis tikushiensis* HAYATA; a, a scale; b, a nutlet, with the style; c, the same in section; d, cellular structure of the outer coat of the nutlet.

minus subtus plus villosa hirsuta, vaginis 5–15 cm. latis ore obliquis hirsutis. Inflorescentia 10–15 cm. longa cylindrico-pyramidalis in circumscriptione, basi umbellatim ramosa, ramis lateralibus inæqualibus 2–10 cm. longis, ramo centrali longissimo 15 cm. longo, apice spiculas singulas vel multas corymbosæ laxæque gerentibus, basi bracteis 5–8 quasiverticillatim instructa, bracteis foliiformibus vel acerosis 2–5 cm. longis inflorescentiam  $\frac{1}{3}$ -plo æquantibus villosis. Spiculæ oblongæ 1 cm. longæ 5 mm. latæ apice acutæ, squamis mediis rotundato-triangularibus  $3\frac{1}{2}$  mm. longis 3 mm. latis apice acutis. Nuculæ obovato-rotundatæ 1 mm. longæ  $\frac{4}{5}$  mm. latæ apice truncatæ basi obtusæ biconvexæ



sub lente tessellatæ leviter elevato-tuberculatæ. Styli 3 mm. longi apice 2-fidi, (ramis recurvis), medio sursum usque ad ramificationem dense barbati basi glabri haud vel vix dilatati; ramis styli glabris.

HAB. Tikushiko, leg. Z. KOBAYASHI, Aug. 1907.

Near *F. diphylla* VAHL, but separable from it by the scabrous broader nutlets and villose leaves.

### *Scirpus* LINN.

#### *Scirpus* (Sect. *Euscirpus*) **erecto-gracilis**

HAYATA sp. nov. (Fig. 31). Annua dense cæspitosa cefoliata. Caulis simplex haud ramosus erectus triqueter glaber 7-25 cm. longus 1 mm. latus efoliatus basi vaginis 2-3 instructus, vaginis infimis brevibus, superioribus longioribus tubuliformibus 3-4 cm. longis 2 mm. latis ore obliquissimis apice acutis; caulis apice cyma singula terminatus et ad bracteam singulam abeuns, bracteis cauliformibus latere complanatis circ. 10 cm. longis 1 mm. latis glabris apice acutis erectis rectis. Cymæ ad apicem caulis quasilateraliter sitæ sessiles cum spiculis circ. 1 cm. longæ et latæ 8-10-spiculigerae, spiculis sessilibus vel breve pedicellatis, pedicellis basi bracteis minutis instructis.

Spiculæ oblongæ 4 mm. longæ  $2\frac{1}{2}$  mm. latæ, basi bracteis (vel squamis sterilibus?) singulis instructæ; squamis mediis  $2\frac{1}{2}$  mm. longis apice cuspidatis. Nucule depresso-obovatæ  $1\frac{1}{2}$  mm. longæ 1 mm. latæ apice late breve acute basi breve cuneatæ in sectione

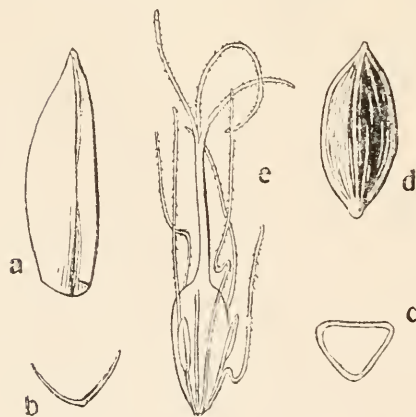


Fig. 32, *Scirpus morrisonensis* HAYATA; a, a scale; b, the same in section; c, a pistil with setae; d, nutlet; e, the same in section.

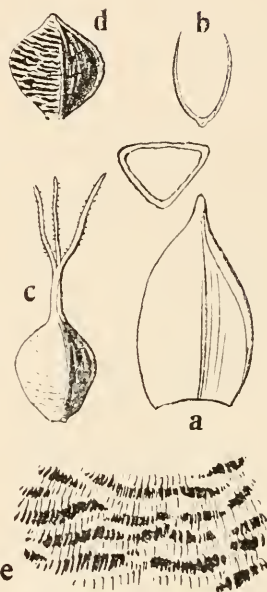


Fig. 31, *Scirpus erecto-gracilis* HAYATA. a, a scale; b, the same in section; c, an ovary; d, a nutlet; d, section of the same; e, cellular structure of the outer coat of the nutlet; transverse grooves and ridges are distinguished by black and white.

by black and white. transverse grooves and ridges are distinguished by black and white.

triangulares dorso angulato-convexæ facie planæ sursum fusco-rubescences deorsum fulvescentes transverse rugulosæ.

HAB. Akō : Kōtanshō, leg. G. NAKAHARA, (No. 510), Sept. 1905 ; Biōritsu : Sōyoshō, leg. G. SHIMADA, Aug. 1907.

Related to *S. supinus*, *S. erectus* and *S. articulatus* ; but different from them by the very much smaller spikelets and by the absence of bristles.

**Scirpus morrisonensis** HAYATA, (Fig. 32) Fl. Mont. Formos. p. 230.

**Scirpus** (Sect. *Euscirpus*) **Sasakii** HAYATA sp. nov.

*Scirpus supinus* LINN. ? "CLARKE in HOOK. f. Fl. Brit. Ind. VI. p. 655 :—Stems medium terete, spikelets in a single lateral head, glumes ovate keeled with suberect mucro, bristles 0, styles 3-fid, nut obovoid triquetrous obtuse transversely scabrous undulate black."

HAB. Tōyēn, leg. S. SASAKI, Nov. 1910 ; Taihoku, leg. S. SASAKI, Juli. 1909.

It is with some hesitation that I have compared this plant to *S. supinus* LINN. The nuts of our plant are very faintly transversely muricated, the styles are 2-fid, bristles always present (6 in number), nuts plano-convex. Our plant is, however, certainly nearer to *S. supinus* than to *S. erectus* in the characters of carinate mucronate glumes and angular spikelets. The description of this new species will be given in the next volume.

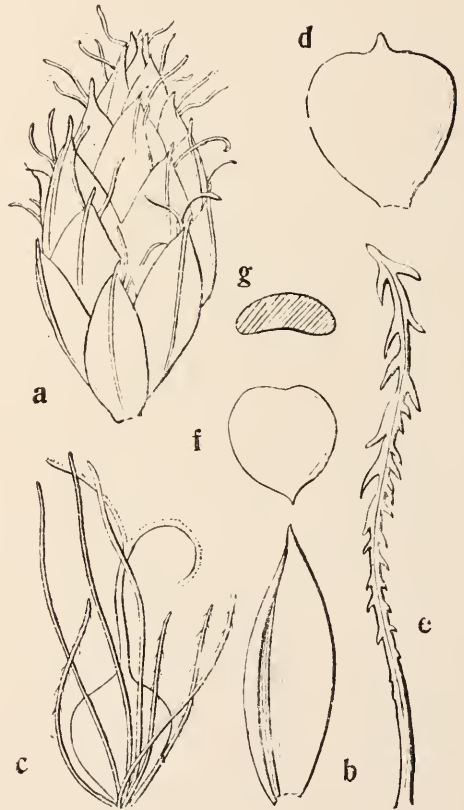


Fig. 33, *Scirpus Sasakii* HAYATA ; a, a spikelet ; b, a glume ; c, an ovary with filaments and setæ ; d, a nutlet ; e, a seta (greatly magnified) ; f, a seed ; g, section of the same.

*Rhynchospora* VAHL.

***Rhynchospora glauca*** VAHL; C. B. CLARKE in HOOK f. Fl. Brit. Ind. VI. p. 671; HEMSLE. Ind. Fl. Sin. III. p. 259.

HAB. Loo-choo: Nakanoshima, leg. S. KAWAGOI, Oct. 1910.

***Rhynchospora longisetigera*** HAYATA sp. nov. Ad humidum vel aquam crescens haud caespitosa semper solitaria; rhizoma ignotum versimiliter repens? Caulis tenuis gracilis 60–100 cm. altus erectus basi usque prope apicem haud ramosus versus apicem pauci-ramosus glaber triquetus 1–1½ mm. latus basi foliis radicalibus caulinis basilaribusque 4–5 suffultus. Folia radicalia caulinis multo breviora linearia circ. 10 cm. longa secus longitudine inferiore plicata in plicato 1 mm. lata vel haud plicata plana tunc 2 mm. lata apice acuminata basi vaginato-dilatata, costa supra impressa subtus acute carinata, margine integra haud scabra lævia utraque pagine glabra apice acuminata, acuminibus interdum triquetris interdum subplanis. Folia caulina 3–4 remotissime disposita inferiora longiora cum vaginis 20–30 cm. longa foliis radicalibus longiora basi vaginata, vaginis 2–4 cm. longis tubuliformibus glabris ore truncatis, auriculis perfecte obsoletis, nervis lateralibus haud visis. Spiculæ versus apicem rami et caulis paucè corymbose vel subglomeratim 3–6 dispositæ breve pedicellatæ, pedicellis plus minus hirsutis 1–3-bracteatis, bracteis lineari-lanceolatis apice interdum setosis vel toto obsoletis; spiculæ lineari-fusiformes in maturo late fusiformes 6–7 mm. longæ utrinque acutæ, squamis inferioribus sterilibus brevioribus, infimis ovato-triangularibus 2 mm. longis 1 mm. latis apice subulatis, superioribus gradatim longioribus 1–2 fertilibus; squamis fertilibus ovato-lanceolatis 7 mm. longis 2½ mm. latis apice acuminatis ad summum ad setulam ½ mm. longam productis basi contractis angustissimis medio latissimis spiculam amplectantibus castaneis; costa obscura. Setæ 5, filiformes 4–4½ mm. longæ nuculam in longitudine 2–plo superantes antrorse scabræ. Stamina 3. Nucula obovata 2 mm. longa 1½ mm. lata apice late truncata basi cuneata biconvexa latere prominente carinata sub lente tenuissime elevato-reticulata castanea; stylus longissimus 8 mm. longus gracillimus filiformis medio sursum bifidus basi valde conico-dilatatus ad basin 1 mm. latus glaber.

HAB. Suisha, leg. B. HAYATA, Mai. 1912.

Near *R. glauca* Vahl; but separable from it in the very much longer setæ and longer spikelets.

*Cladium* P. BR.

***Cladium jamaicense*** CRANTZ (Fig. 34); HAYATA Mater. Fl. Formos. p. 377. Our specimens are a little different from the typical form of the species. In the former, the spikelets are arranged in the less numerous clusters and the inflorescence is looser than in the latter.



Fig. 34, *Cladium jamaicense* CRANTZ; a, a cluster of spikelets.

*Scleria* BERG.

***Scleria pubigera*** MAKINO.

HAB. Tōyen, leg. T. SŌMA, Oct. 1914; Daijiorin, leg. Y. SHIMADA, Oct. 1914.

Compared with a specimen so labelled in the Herbarium at Tōkyō. Our specimens are more patently or sometimes retrorsely hairy, while the Japanese are less patently hairy.

*Carex* LINN.

On working up the collections of *Carex*, I have principally followed the system of G. KÜKENTHAL appearing in ENGLER'S "Das Pflanzenreich: Cyperaceæ-Caricoideæ." Among the subgenera, *Primocarex* is not represented in Formosa, while *Vigneæ* is represented by 1, *Indocarex* also by 5, and *Eucarex* by 28 species. As to the arrangement of the sections of the subgenus *Eucarex*, I have found it extremely difficult to follow KÜKENTHAL'S system. According to this eminent authority, the subgenus is divided into two groups on the basis whether utricles are "crostrati vel brevirostres raro longirostres, rostrum ore truncatum vel emarginatum raro leviter bidentatum," or "longius vel brevius rostrati, rostrum ore bidentatum raro integrum." This arrangement is not proved to be practicable in the Formosan species. The latter group is divided into two divisions on the basis whether leaves are "nunquam septatodosa" or "septato-nodosa." I am very much puzzled to understand

what is meant by "septato-nodosa." After some considerations, I became convinced that it means something like elevation of tessellate veinlets on the surface of the leaves, and therefore it means "gegittert." According to his system there are, however, included in the subgroup of "folia nunquam septato-nodosa" many species which have "folia septato-nodosa;" and there are also in the subgroup of "folia septato-nodosa," many plants whose leaves are not "septato-nodosa." On the whole, the clavis of the sections of the subgenus *Eucarex* given by KÜKENTHAL is not practicable, as far as are concerned the Japanese and Formosan species. As an example of the contradiction, I may point out *Carex alliiformis* included after his system in the subgroup of "folia nunquam septato-nodosa," and *C. pumila* referred to the subgroup of "folia septato-nodosa." The leaves of the former species have distinctly elevated tessellate veinlets, while those of the latter do not show any trace of elevated veinlets.

*Conspectus of the subgenera of the Formosan Species.*

- a. Spicules usually bisexual, sessile, cladoprophyllum (scale at the base of spicules) mostly wanting.....subg. *Vignea*.
- b. Spicules bisexual or unisexual often pedunculate, cladoprophyllum usually exists.
  - a. Spicules usually bisexual, cladoprophyllum utriculiformed....  
subg. *Indocarex*.
  - β. Spicules mostly unisexual, cladoprophyllum ocreiformed....  
subg. *Eucarex*.

Subgenus **Vignea** NEES.

Spicules ♂ at the apex.

Sect. *Fatidex*.....*C. pseudo-arenicola*.

Spicules ♂ at the base.

Sect. *Elongate*: This is not represented in Formosa.

**Carex pseudo-arenicola** HAYATA sp. nov. (Fig. 35, f-j). Rhizoma repens plus minus ascendens teres supra quasi-1-seriatim caules vel fasciculos foliorum gerens. Fasciculus foliorum 5-6-folius basi squamis oblongis apice acutis 3-4 instructus, foliis linearibus cum vagina 17 cm. longis 2 mm. latis, vaginis tubuliformibus 3 cm. longis circ. 2 mm. latis ore perfecte truncatis,



laminis glabris chartaceo-membranaceis planis marginibus haud scabris. Caulis glaber basi foliis paucis instructus scapiformis circ. 20 cm. longus apice spiculas spicatum gerens, spicis 2-3 cm. longis 5 mm. latis; spicula terminali masculina, lateralibus bisexualibus. Spiculæ erectæ haud patentes a se 2-4 mm. distantes; lateralibus 7-8-floratis, floribus superioribus masculinis cæterum fœmineis; cladoprophyllum nullum. Fl. ♂: squamis oblongis 3 mm. longis; stamina 3, antheris linearibus 1½ mm. longis apice fasciculo minuto singulo pilorum coronatis basi brevissime auriculatis. Fl. ♀: glumis (vel squamis) mediis ovato-lanceolatis 3-4 mm. longis 1½ mm. latis apice acuminatis glabris 1-costatis margine erosis. Utriculus ovato-lanceolatus 4 mm. longus 1 mm. latus apice acuminato-attenuatus ad summum 2-dentatus basi obtusus dorso convexus facie planus margine sub microscopio remote minute setulosus dorso 5-castaneo-striatus glaber. Nucula oblonga glabra plano-convexa *Carex arenicola* HAYATA Mater. Fl. Formos. p. 378 (non F. SCH.)

HAB. Mt. Morrison, leg. T. KAWAKAMI et U. MORI, Oct. 1908.

Resembles *C. arenicola* F. SCHMIDT in the external features; but really distinct from it in having lanceolate utricles which are attenuate at both apex and base, and in the lack of spongy excrecence at the base of the utricles.

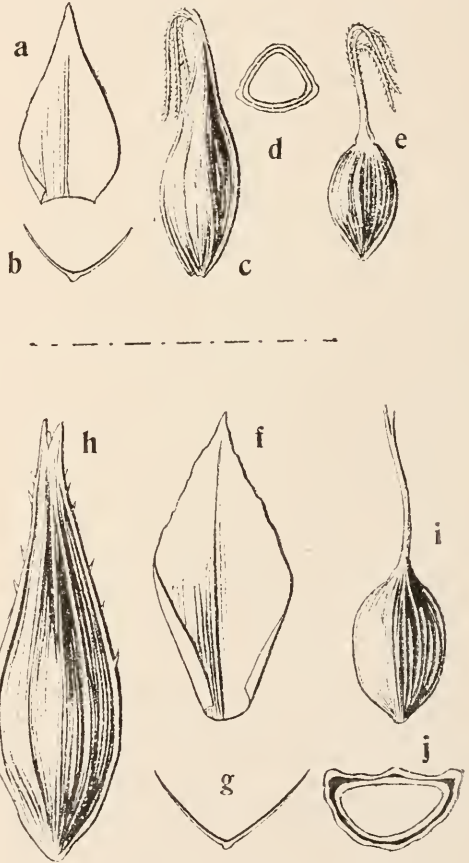


Fig. 35, a-e, *Carex satsumensis* FR. et SAV. var. *Nakaii* HAYATA; a, a scale; b, the same in section; c, an utricle; d, the same in section; e, a nutlet. f-j, *Carex pseudoarenicola* HAYATA; f, a scale; g, the same in section; h, an utricle; i, a nutlet; j, the same in section, with the utricle.

Subgenus **Indocarex** BAILL.

Spicules all supported by a fertile cladophyllum; bracts nearly none

sect. *Japonicæ*.

Spicules all supported by a sterile cladophyllum.

Spicules cylindrical 2-6 cm. long.....sect. *Polystachyæ*.

Spicules hardly longer than 1.5 cm.....sect. *Indicæ*.

Sect. *Japonicæ*.

Culms slender nearly 30 cm. long ..... *C. satsumensis*, var. *longiculma*.

Culms very much shorter, usually 10 cm. long.. *C. satsumensis* var. *Nakaii*.

**Carex satsumensis** FR. et SAV. var. **longiculma** HAYATA n. v. (Pl. XVII.) Dense cæspitosa; rhizoma haud repens. Caulis circ. 30 cm. longus simplex haud ramosus glaber basi foliis 2-4 suffultus apice spicato-paniculiformis basibus exceptis haud foliatus. Folia basi caulis quasi-fasciculata longe vaginata cum vaginis 30-40 cm. longa caulem in longitudine superantia tenuiter chartacea glabra, vaginis tubuliformibus 5-10 cm. longis tenuiter membranaceis ore truncatis integris, laminis longe linearibus 20-30 cm. longis  $2\frac{1}{2}$ -3 mm. latis apice longe lineari-acuminatis margine tenuiter scabriusculis utraque pagine glabris. Panicula terminalis singula circ. 6 cm. longa cylindrica  $1-1\frac{1}{2}$  cm. lata basi et basi rami paniculae bracteis instructa erecta, ramis brevibus paucis 1 cm. longis ascendentibus haud patentibus interdum leviter patentibus; bractea cum cladophyllo singula sub ramo paniculae insita; bracteis infimis longissimis foliiformibus paniculam in longitudine superantibus; bracteis cæteris brevioribus 2-3 mm. longis subulato-linearibus basi dilatatis. Spiculæ a basi ramorum paniculae usque ad apicem vel in parte superiore paniculae spicatum dispositæ generaliter bisexuales (sed in ramo inferiore unisexuales tunc floribus lateralibus fœmineis, iis terminalibus masculinis); spiculæ inferiores interdum ad florem singulum fœmininum reductæ, superiores bisexuales cylindricæ 5-6 mm. longæ, floribus inferioribus fœmineis superioribus masculinis; spiculæ totæ basi bractea sterili et cladophyllo instructæ (vel cladophyllum rarius obsoletum); bracteis sterilibus triangulari-ovatis 2 mm. longis 1 mm. latis apice cuspidatis; cladophyllis ovatis  $1\frac{1}{2}$ -2 mm. longis valde concavis subventricosus apice late truncatis leviter bidentatis vel haud dentatis exteriore reflexis utricululum reductum amplectantibus. Fl. ♂: squamis ovato-lanceolatis 3 mm. longis quam squama floris fœminei angustioribus apice

acutis; stamina 3, antheris linearibus  $1\frac{1}{2}$  mm. longis  $\frac{1}{3}$  mm. latis apice connectivo brevissimo apiculatis basi subtruncatis obscure brevissime auriculatis. Fl. ♀: squamis ovatis vel ovato-oblongis vel ovato-lanceolatis  $1\frac{1}{2}$ –2 mm. longis apice acutis; utriculus fructifer ovato-fusiformis  $2\frac{1}{2}$ –3 mm. longus  $\frac{3}{4}$  mm. latus glaber obscure costulatus apice gradatim attenuatus ad summum brevissime minuteque 2-dentatus basi obtusus. Nucula ellipsoidea  $1\frac{1}{4}$  mm. longa  $\frac{2}{3}$  mm. lata fusco-castanea apice basique obtusa lævis; stylus basi dilato-incrassatus interdum geniculato-recurvus apice trifidus glaber.

HAB. in monte Morrison, 6000 ped. alt., leg. T. KAWAKAMI et S. SASAKI, Oct. 1909.

Differs from the type by the much longer and slenderer culms with longer leaves and by the tubi-formed cladophylla.

**Carex satsumensis** FR. et SAV. var. **Nakaii** HAYATA n. n. (Fig. 35, a-c). Cæspitosa 6–7 cm. alta. Folia basi caulis fasciculata, (fasciculis 5–8-foliatis basi squamis oblongis instructis, squamis superioribus gradatim ad folium abeuntibus), erecta vel patentia linearia cum vaginis 6–8 cm. longa cum cauli æquilonga vel quam caules breviora; foliis exterioribus basi vaginatis sed iis interioribus haud vaginatis, vaginis tubulosis circ. 1 cm. longis 2–2½ mm. latis glabris ore perfecte truncatis integris; ligulis brevissimis lamelliformibus integris; laminis linearibus 5–6 cm. longis 3 mm. latis apice acuminatissimis subplanis coriaceis lævibus margine scaberrimis. Caulis cum spica 7–8 cm. longus acute triqueter glaber erectus  $\frac{2}{3}$  mm. latus lævis; spica 2½ cm. longa cylindrica 1 cm. lata densiuscule spiculigera, spiculis horizontaliter patentibus; bracteis deciduis linearibus quam spica brevioribus. Spiculæ lineares 8 mm. longæ; terminali masculina, lateralibus bisexualibus; laterales deorsum flores foemineos sursum flores masculinos gerentes; squamis infimis (i. e. cladophyllis) ovatis dorso basi ventricosis basin spiculæ amplexantibus 2 mm. longis apice obtusis; squamis mediis ovato-triangularibus apice acutis basi perfecte truncatis 2 mm. longis glabris. Utriculus ovoideo-fusiformis  $2\frac{1}{2}$  mm. longus  $\frac{2}{3}$  mm. latus glaber dorso convexus facie subplanus in sectione trigonus dorso multo tenuiter elevato-striatus facie haud striatus apice attenuatus basi obtusus apice brevissime 2-dentatus. Nuculæ oblongæ  $1\frac{1}{2}$  mm. longæ  $\frac{2}{3}$  mm. latæ nigricantes trigonæ dorso convexæ facie planæ apice basique obtusæ infra summum constrictæ apice ad stylum abeuntes læves.

HAB. Monte Morrison, ad 9000  
ped. alt., leg. S. SASAKI, Oct. 1909;  
montibus centralibus, leg. U. MORI et  
S. NAKAI, Dec. 1909.

Differs from the type by the  
much shorter culms and by the  
tubiformed cladophylla.

Sect. *Polystachya*.

**Carex baccans** NEES. (Fig. 36,  
a-f); MATSUM. et HAYATA Enum.  
Pl. Formos. p. 493.

Sect. *Indica*.

a. Partial panicles explicate.

α. Spicules very much slender  
..... *C. pseudo-filicina*.

β. Spicules oblong, stronger than  
the preceding species. ....  
..... *C. filicina*.

b. Partial panicles contracted. ....  
..... *C. hakkuensis*.

**Carex pseudofilicina** HAYATA  
(Fig. 36, g-k), Mater. Fl. Formosa.  
p. 391.

**Carex filicina** NEES; MATSUM.  
et HAYATA Enum. Pl. Formos. p.  
495.

**Carex hakkuensis** HAYATA  
sp. nov. (Fig. 37). Rhizoma ignotum.  
Caulis triqueter circ. 1 m. altus glaber  
foliatus. Folia radicalia ignota; cau-  
lina erecta cum vaginis 30-40 cm.  
longa glabra, vaginis triquetris cy-  
lindricis 5-6 cm. longis 6 mm. latis

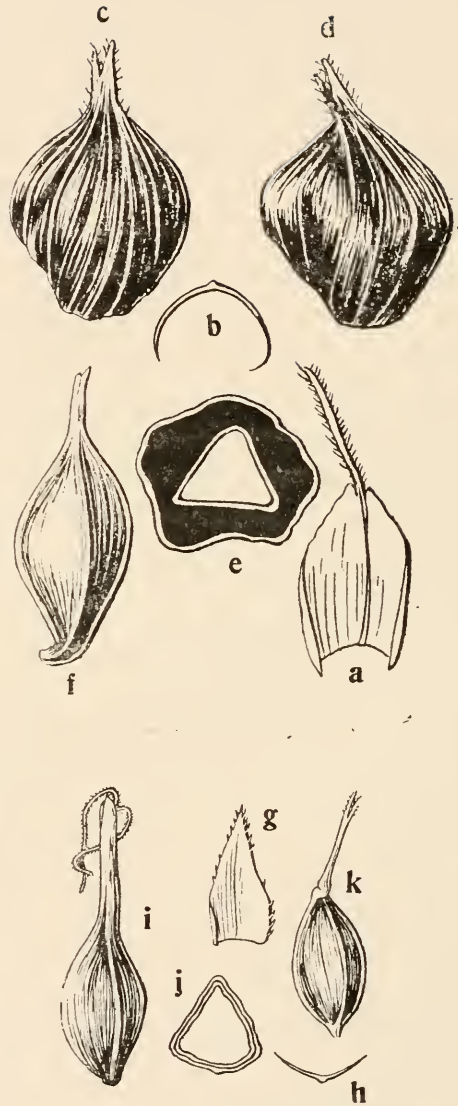


Fig. 36, a-f, *Carex baccans* NEES; a, a glume; b, the section of the same; c, an utricle; d, the same, seen from another side; e, section of the same; f, a nutlet. g-k, *Carex pseudofilicina* HAYATA; g, a glume; h, the section of the same; i, an utricle; j, the section of the same; k, a nutlet.



glabris ore obliquis nervosis, laminis linearibus 25–35 cm. longis 1 cm. latis apice acuminatissimis utraque pagine levibus glabris margine scabris, acuminibus supra scaberrimis subtus levibus. Panicula terminalis 15 cm. longa in ambitu cylindrica 4 cm. lata ad nodos foliata, ramis paniculae cretis 12 cm. longis semiteretibus ad angulos minute hirsutis a basi usque ad supra medium haud ramosis versus apicem ramulos 4–5 gerentibus, ramulis a basi usque ad apicem spiculigeris basi bracteis minutis singulis instructis; bracteis ovatis 2 mm. longis apice 2-fidis dorso interdum apice setigeris,

(setis 3 mm. longis hirsutis) basi amplexicaulibus; ramulis ordinis I. et II. basi bracteis singulis et cladophyllis singulis instructis hirsutis; cladophyllis ramuli ordinis I. semi-urceolatis 2 mm. longis dorso infra apicem ventricosas basin rhachis semi-amplexantibus apice expansis 2-fidis dorso minute plus minus hirsutis dorso nervosis apice margineque tenuiter membranaceis medio basique crassiusculis; bracteis singulis basi spiculæ insitis late ovatis  $2\frac{1}{2}$  mm. longis 3 mm. latis apice subito subulato-acutis membranaceis; cladophyllis basi spiculæ insitis late ovatis  $1\frac{1}{3}$  mm. longis 1 mm. latis intus valde concavis extus valde convexis dorso plus minus minute hirsutis apice truncatis 2-dentatis sterilibus. Spiculæ toto bisexuales cylindrico-fusiformes 8–10 mm. longæ  $1\frac{1}{2}$ –2 mm. latæ apice acutæ basi obtusæ, floribus paucis basilari-bus foemineis cæteris masculinis. Fl. ♂: squamis floris masculini elongato-ovatis  $4\frac{1}{2}$  mm. longis  $2\frac{1}{3}$  mm. latis membranaceis apice obtusis medio tenniter trinerviis, antheris 3 linearibus 2 mm. longis  $\frac{1}{5}$  mm. latis apice obtusis apice sub microscopio pilis minutis setiformibus 4–5 instructis. Fl. ♀: squamis floris foeminei ovatis  $2\frac{1}{2}$ –3 mm. longis circ. 2 mm. latis apice acutis basi leviter contractis. Utriculus fructifer elongato-ellipticus apice attenuatus  $3\frac{2}{3}$  mm. longus  $1\frac{1}{4}$  mm. latus sursum minute hirsutus deorsum glaber trigonus basi

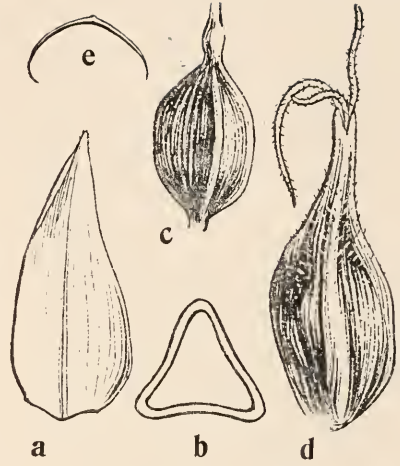


Fig. 37, *Carex halckuensis* HAYATA;  
a, a glume; b, an utriculus; c, a nutlet;  
d, the section of the same; e, the section  
of the glume.



obtusus apice 2-dentatus. Nucula fusco-castanea trigono-oblonga  $1\frac{1}{2}$  mm. longa 1 mm. lata apice obtusa ad stylum abeuns basi acuta ad stipitem 0.3 mm. longum abeuns trigona ad angulos prominente carinata facie leviter concava; stylus basi plus minus incrassatus apice 3-fidus.

HAB. Haknutaian, leg. U. MORI, Sept. 1910.

Subgenus **Eucarex** COSS et GERM.

Utricles not, or very shortly, rostrate.

Female spicules densely flowered, bracts not vaginate...Sect. *Maximæ*.

Female spicules loosely flowered, bracts usually vaginate. Nutlet.

mitrate at the apex.....Sect. *Mitrates*

Utricles long or shortly rostrate, beak 2-toothed rarely entire.

Leaves never septato-nodose (excepting *Carex alliiformis*)

Scales ♀ dark purple or dark brown.....Sect. *Frigidæ*.

Scales ♀ ferrugineous or pale, rarely dark-brown.

Beaks of utricles 2-toothed or entire.

Spicules ♀ mostly loosely flowered, bracts mostly vaginate;  
utricles nearly straight ovate-elliptical or narrower,  
pale green obsoletely nervose....Sect. *Hymenochlæne*.

Spicules ♀ densely flowered, bracts mostly not vaginate;  
utricles at length divaricate, ovate, rich brown or  
dark green, many-nerved.....Sect. *Tumidæ*.

Beaks of the utricles conspicuously 2-toothed.....

Sect. *Rhomboidales*.

Leaves septato-nodose (*Carex pumila* excepted)

Utricles glabrous

Utricles membranaceous long rostrate...Sect. *Pseudo-cyperaceæ*.

Utricles subcoriaceous or suberous shortly rostrate.....

Sect. *Paludosæ*.

Utricles more or less hirsute.....Sect. *Hirtæ*.

Sect. *Maximæ*.

**Carex maculata** BOOTH; MATSUM. et HAYATA Enum. Pl. Formos. p.

Sect. *Mitratae*.

1. Bracts shortly vaginate at the base; spicules ♀ oblong densely flowered. .... 2  
     Bracts long vaginate at the base; spicules ♀ narrowly cylindrical subloosely flowered. .... 3
2. Scales of ♀ and ♂ long caudate at the apex. .... *C. breviculmis*.  
     Scales of ♀ and ♂ very shortly caudate at the apex. .... *C. morrisonicola*.
3. Scales of male flowers acute at the apex. .... *C. orthostemon*.  
     Scales of male flowers very obtuse or truncate at the apex. .... 4
4. Male spicules narrowly cylindrical. .... *C. tristachya* var. *pocilliformis*.  
     Male spicules broadly cylindrical. .... *C. transalpina*.

**Carex breviculmis** R. Br. (Fig. 38, a-e); MATSUM. et HAYATA Enum. Pl. Formos. p. 493. = *Carex chinensis* HAYATA Mater. Fl. Formos. p. 381 (non Retz.).

**Carex morrisonicola** HAYATA Mater. Fl. Formos. p. 387.

**Carex tristachya** THUNB. var. **pocilliformis** KÜK. (Fig. 38, j-m); MATSUM. et HAYATA Enum. Pl. Formos. p. 496. Cæspitosa. Caulis basi foliis 3-4 suffultus glaber erectus

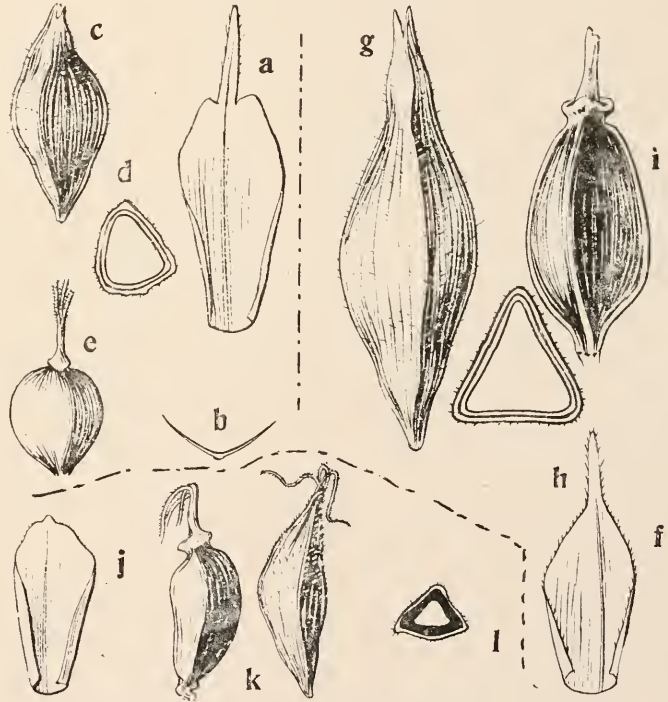


Fig. 38, a-e, *Carex breviculmis* R. Br; a, a glume; b, section of the same; c, an utricle; d, section of the same; e, a nutlet. f-i, *Carex orthostemon* HAYATA; f, a glume; g, an utricle; h, section of the same; i, a nutlet. j-m, *Carex tristachya* THUNB. var. *pocilliformis* KÜKENTH; j, a glume; k, an utricle; l, section of the same; m, a nutlet.

gracillimus 20–25 cm. longus paucissime ramosus vel haud ramosus versus apicem spiculas 2–4 gerens. Folia basi caulis 3–4-quasi-fasciculata tenuiter coriacea haud rigida glabra vaginata cum vaginis 10–25 cm. longa quam caulis breviora, vaginis 3 cm. longis  $1\frac{1}{2}$  mm. latis ore obliquis integris, (ligulis integris brevissimis lamelliformibus), laminis linearibus 7–22 cm. longis 2 mm. latis apice acuminatis margine subintegris sed sub lente retrorse minute molleque setulosis utraque pagine glabris. Spiculæ paucæ versus apicem caulis 2–4 sitæ; inferiores lateralesque fœmineæ; terminales bisexuales sursum floribus fœmineis deorsum floribus masculinis instructæ; vel terminales masculinæ. Spiculæ masculinæ erectæ terminales triquetrae cylindrico-filiformes 1–2 cm. longæ  $\frac{1}{2}$ – $\frac{2}{3}$  mm. latæ, (bracteis obsoletis). Fl. ♂; squamis mediis vagini-formibus 2 mm. longis apice obtusissimis tenuiter hirtellatis ore obliquissimis glabris; stamina 3, filamentis glabris brevibus dilatatis fere perfecte se connatis, antheris linearibus 1 mm. longis apice basique truncatis; rhachillæ rectæ. Spiculæ fœmineæ cylindrico-lineares 15–18 mm. longæ 3 mm. latæ erectæ sessiles vel graciliter pedicellatæ. Fl. ♀: squamis mediis triangulari-ovatis 2 mm. longis  $1\frac{1}{2}$  mm. latis utriculū fere amplexantibus 1–costatis apice triangulari-obtusis glabris. Utriculus trigono-obovoideus  $2\frac{1}{3}$  mm. longus 1 mm. latus apice breve late oblique rostratus, (rostris exteriori recurvis) basi cuneatus hirsutus multo costulatus apice haud dentatus sed tenuissime fissus crassiusculus. Nucula castanea trigono-rhomboides-obovoidea  $1\frac{2}{3}$  longa 1 mm. lata sublevi apice truncata basi oblique constricta brevissime stipitata, stipite crasso, apice truncata plus minus depressa partibus basis styli dilatis mitriformibus coronata. Stylus apice trifidus. Bractæ basi spiculæ infimæ insitæ foliiformes spiculas 2-plo superantes.

HAB. Ritōzan, leg. T. KAWAKAMI, Juli. 1913, (No. 4).

Near *C. tristachya* THUNB.; but differs from it in having obovate, much shorter nutlets.

**Carex orthostemon** HAYATA (Fig. 38, f-i), Mater. Fl. Formos. p. 389.

**Carex transalpina** HAYATA Mater. Fl. Formos. p. 398.

Sect. *Frigide*.

Scales of male flowers distinctly costate, costa pale yellow... *C. Shimadai*.

Scales of male flowers not at all or very slightly costate... *C. fulvorubescens*.

**Carex Shimadai** HAYATA (Fig. 39, a-e), Mater. Fl. Formos. p. 396.

**Carex fulvo-rubescens** HAYATA (Fig. 39, f-j), Mater. Fl. Formos. p. 383.

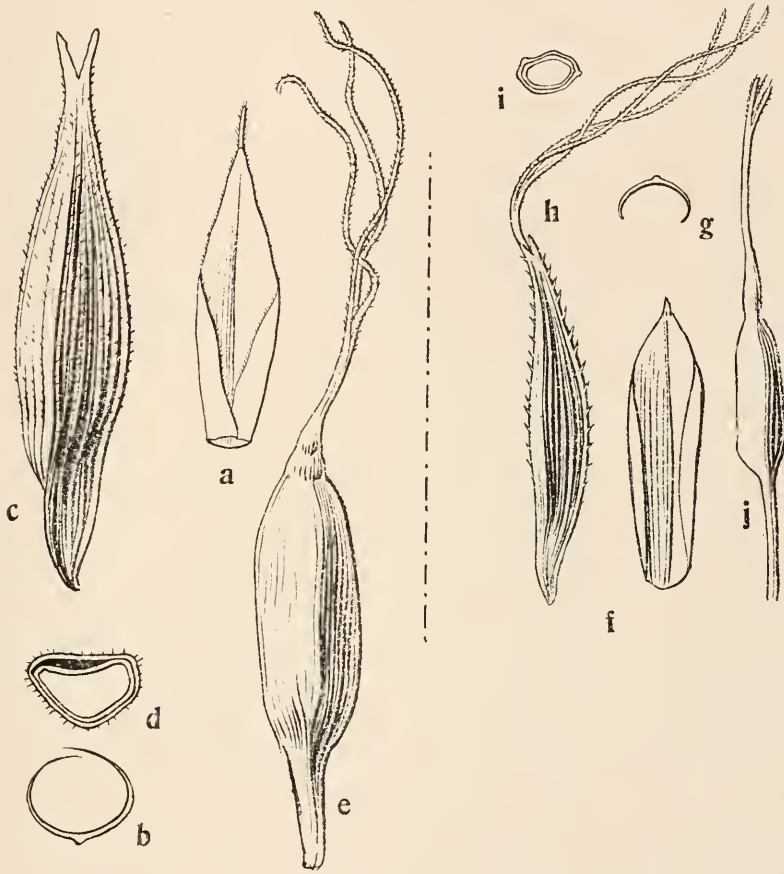


Fig. 39, a-e, *Carex Shimadai* HAYATA; a, a glume; b, section of the same; c, an utricle; d, section of the same; e, a nutlet. f-j, *Carex fulvo-rubescens* HAYATA; f, a glume; g, section of the same; h, an utricle; i, section of the same; j, a nutlet.

Sect. *Hymenochlaenae*.

**Carex longispica** HAYATA Mater. Fl. Formos. p. 386.

**Carex Nakaharai** HAYATA (Fig. 40, a-d), Mater. Fl. Formos. p. 387.

**Carex bilateralis** HAYATA (Fig. 40, e-i), Mater. Fl. Formos. p. 380.

**Carex brunnea** THUNB. (Fig. 40, j-n); MATSUM. et HAYATA Enum. Pl. Formos. p. 493.

HAB. Kōtōshō, leg. T. KAWAKAMI et S. SASAKI, Juli. 1912.

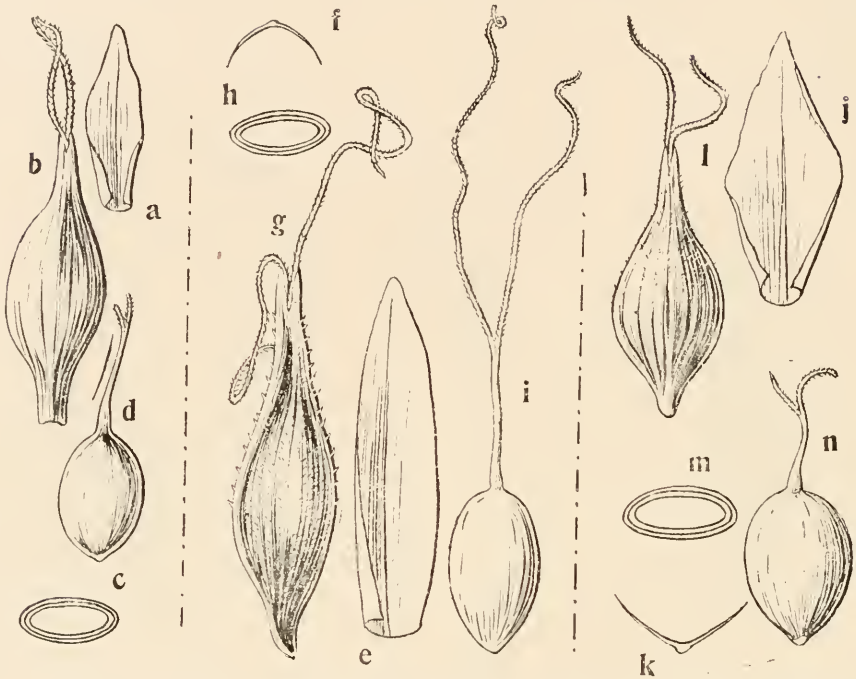


Fig. 40, a-d, *Carex Nakaharai* HAYATA; a, a glume; b, an utricle; c, section of the same; d, a nutlet. e-i, *Carex bilateralis* HAYATA; e, a glume; f, section of the same; g, an utricle; h, section of the same; i, a nutlet. j-n, *Carex brunnea* THUNB.; j, a glume; k, section of the same; l, an utricle; m, section of the same; n, a nutlet.

#### Sect. *Tumida*.

Lateral spicules ♂, with a few male flowers at the base, bracts long vaginate, vaginae purple, ♀-scales fusco-rubescens..... *C. alliiformis*.

Lateral spicules only ♀, bracts not vaginate, ♀-scales pale-yellow, or sordid stramineous.

Utricles  $2\frac{1}{2}$  mm. long..... *C. pseudojaponica*.

Utricles 4 mm. long..... *C. Kawakamii*.

**Carex alliiformis** C. B. CLARKE; KÜKENTHAL Cyper.-Caricoid. in Pfl.-reich p. 618. *Carex purpurascens* KÜK.; MATSUM. Ind. Pl. Jap. II.-1 p. 129.

HAB. Okinawa.



**Carex pseudojaponica** HAYATA (Fig. 41, c-d), Mater. Fl. Formos. p. 392.

**Carex Kawakamii** HAYATA (Fig. 41, e-h), Mater. Fl. Formos. p. 385.

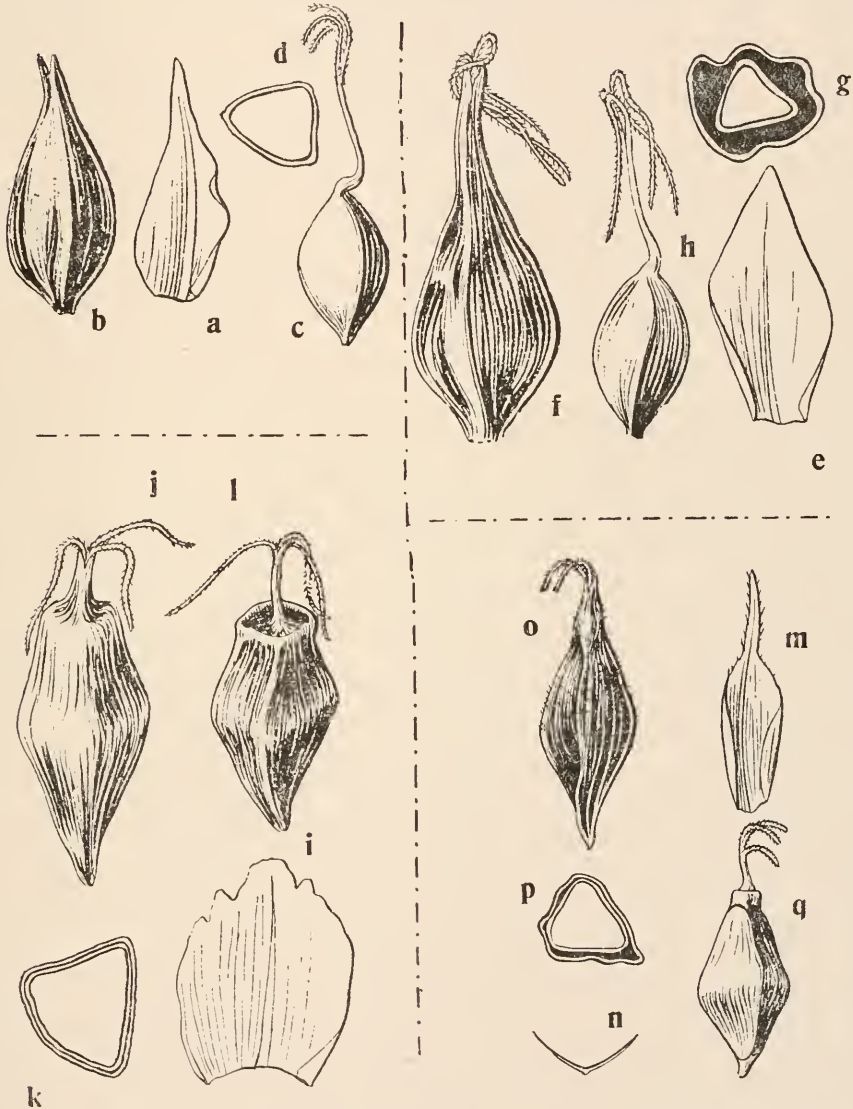


Fig. 41, a-d, *Carex pseudojaponica* HAYATA; a, a glume; b, an utricle; c, nutlet; d, section of the same. e-h, *Carex Kawakamii* HAYATA; e, a glume; f, an utricle; g, section of the same; h, a nutlet. i-j, *Carex obtusobracteata* HAYATA; i, a glume; j, an utricle; k, section of the same; l, a nutlet. m-q, *Carex chinensis* RETZ; m, a glume; n, section of the same; o, an utricle; p, section of the same; q, a nutlet.

Sect. *Rhomboidales*.

1. Male spicules linear-cylindrical. Female spicules cylindrical..... 2  
 Male spicules often subclavate. Female spicules oblong or ovate.....  
*C. arisanensis*.
2. Scales obtuse..... *C. obtusobracteata*.  
 Scales acute or caudate..... 3
3. Culms lateral..... *C. atronucula*.  
 Culms central..... *C. chinensis*.

**Carex arisanensis** HAYATA (Pl. XVIII.) Mater. Fl. Formos. p. 378.

Dense cæspitosa; rhizoma haud repens. Caulis tenuissimus primum erectus sed fructibus maturis deorsum recurvus trigonus ad angulos anguste alatus interdum efoliatus basi squamis linearibus instructus, interdum foliis radicalibus et foliis caulinis basilaribus suffultus glaber simplex vel interdum versus apicem ramo singulo instructus; squamis basi caulis 3-4-sitis. Folia 3-4-fasciculata (fasciculis basi squamis 3-4-suffultis), cum vaginis 10-40 cm. longa cauli breviora vel æquilonga, vaginis 1-3 cm. longis primum tubiformibus demum toto fissis triquetris dorso prominente carinatis utroque latere apicis auricula 5 mm. longa apice obtusa  $\frac{2}{3}$  mm. lata latere altero cum laminis connata latere altero libera tenuissime membranacea integra instructis glabris; laminis linearibus 7-40 cm. longis 3-7 $\frac{1}{2}$  mm. latis apice lineari-acuminatis, costa supra impressa subtus carinato-elevata, utraque pagine glabris margine scaberrimis chartaceis suberectis. Canles vel rami caulis apice spiculas 1-3 gerentes, spiculis se approximatis. Spicula terminalis singula masculina, iis lateralibus fœmineis vel bisexualibus bractea singula instructis, bracteis spicam in longitudine æquantibus vel eam superantibus; spicula lateralis breve vel longe pedicellata, pedicellis basi vagina una instructis, vaginis tubiformibus 1 mm. longis subventricosis hyalinis cladophylli-formibus; spicula masculina pedicellata, (pedicellis 2 mm. longis haud vaginatis), subclavato-cylindrica 6 mm. longa 1 mm. lata triquetra apice obtusa; squamis mediis oblongis 2 $\frac{1}{2}$  mm. longis 1 mm. latis apice obtusissimis integris 1-costatis basi rhachin complete

amplectantibus; stamina 3, filamentis filiformibus 3 mm. longis basi plus minus dilatatis, antheris linearibus 2 mm. longis  $\frac{1}{5}$  mm. latis apice subacutis basi subtruncatis. Spicula feminea in ambitu cylindrica 6 mm. longa 2 mm. lata 5-6-florata; matura 2-3 fructifera; squamis mediis fructiferis ovato-oblongis  $2\frac{1}{2}$  mm. longis  $1\frac{1}{2}$  mm. latis apice obtusis basi rhachin semi-amplectantibus glabris integris. Utriculus maturus trigonus ovoideus fusiformis apice longe-rostratus cum rostris 6 mm. longus 2 mm. latus basi acutus tenuiter multi-striatus glaber, rostris 2-3 mm. longis apice 2-dentatis. Nucula obovoideo-trigona 3 mm. longa 2 mm. lata apice obtusissima basi acuto-obtusa subflava lævis; stylus ad basin geniculatim anteriore recurvus tunc subito angulo recto ascendens apice 3-fidus glaber.

HAB. Mt. Arisan, 7400 ped. alt., leg. B. HAYATA, Aprili. 1914.

Very much resembles *C. filipes* FR. et SAV. (KÜKENTHAL *Cyperaceæ-Caricoideæ* in ENGL. Pfl.-reich p. 640, fig. 109), but differs from it in the more approximately flowered female spicules, and in the very much shortly peduncled male spicules. A sheath which is very much like cladophyllum is always present at the base of the pedicel of a lateral spikelet.

**Carex obtusobracteata** HAYATA sp. nov. (Fig. 41, i-l).

The description will be given in the next volume.

**Carex atronucula** HAYATA Mater. Fl. Formos. p. 379.

**Carex chinensis** RETZ. (Fig. 41, m-q); BOOTT Illustr. I. (1858) pp. 13 et 74 t. 36; MATSUM. et HAYATA Enum. Pl. Formos. p. 494.

*Carex sociata* HAYATA Mater. Fl. Formos. p. 398 (non BOOTT.)

#### Sect. *Pseudo-cypereæ*.

**Carex Sasakii** HAYATA (Fig. 42, a-e), Mater. Fl. Formos. p. 395.

HAB. Nantō: Suisha, leg. U. MORI, (No. 3749).

#### Sect. *Paludosæ*.

**Carex pumila** THUNB. (Fig. 43); MATSUM. et HAYATA Enum. Pl. Formos. p. 496.

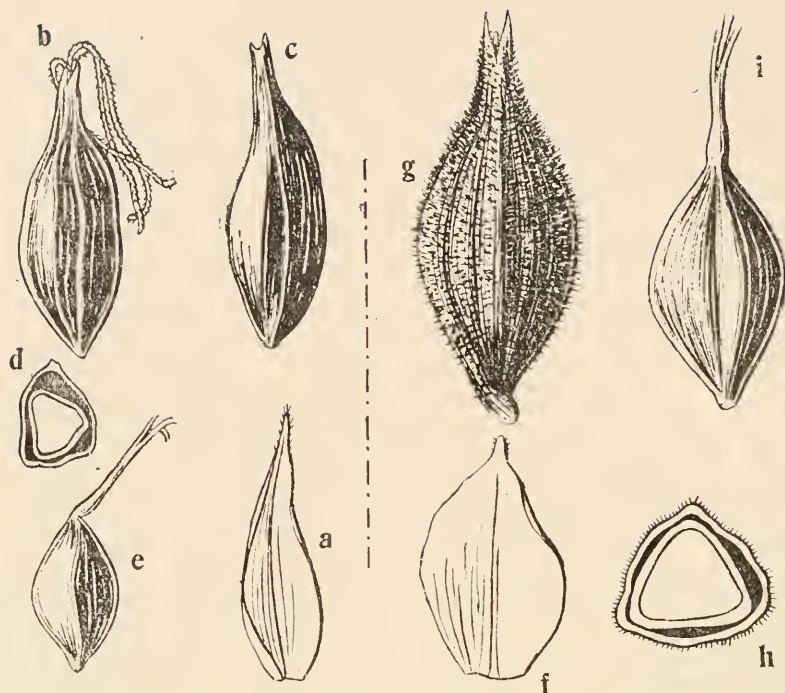


Fig. 42, a-e, *Carex Sasakii* HAYATA; a, a glume; b, an utricle; c, the same, seen from side; d, section of the same; e, a nutlet. f-i, *Carex hebecarpa* C. A. MEY. var. *ligulata* KÜK.; f, a glume; g, an utricle; h, section of the same; i, a nutlet.



Fig. 43, *Carex pumila* THUNB.  $\times 6$ ; a, a glume; b, an utricle; c, section of the same; d, a nutlet.

Sect. *Hirtæ*.

**Carex hebecarpa** C. A. MEY var. **ligulata** (Nees) KÜKENTHAL (Fig. 42, f-i), Cyperaceæ-Caricoideæ p. 745; MATSUM. Ind. Pl. Jap. II.-1 p. 113.

HAB. Musha: Sakuragamine, ad 8000 ped. alt., leg. R. PRICE, Oct. 1912.

Agrees pretty well with the specimens so labelled in the herbarium at Tōkyō.

*Section uncertain.*

**Carex reflexistyla** HAYATA (Fig. 44); Mater. Fl. Formos. p. 393.

**Carex Dunni** HAYATA Mater. Fl. Formos. p. 382.

**Carex tatsutakensis** HAYATA sp. nov. (Fig. 45). Densissime caespitosa, rhizomatibus brevissimis haud repentibus, radicibus fibrosis rigidissimis. Caules semper quasi-gemini basi foliis 3-4 suffulti, 4-10 cm. longi foliis breviores, alter longior, alter multo brevior; canlis longior apice spiculam masculinam terminalem singulam et spiculas feminas duas laterales gerens; caulis brevior spicula feminea singula terminatus; caulis haud

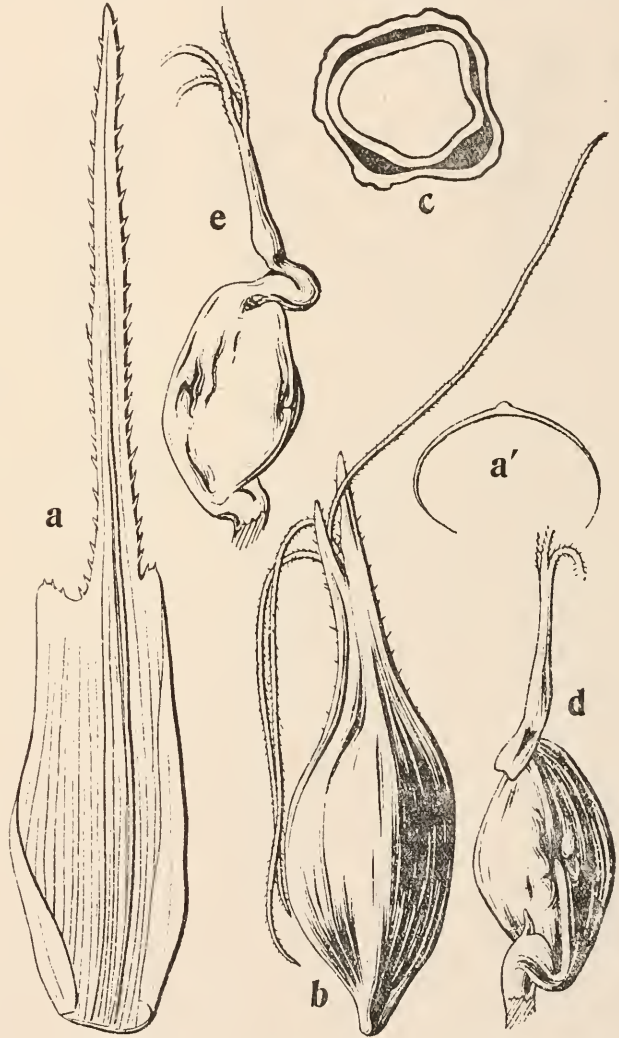


Fig. 44, *Carex reflexistyla* HAYATA  $\times 12$ ; a, a glume; a', section of the same; b, an utricle; c, section of the same; d, a utricle; e, the same, seen from another side.



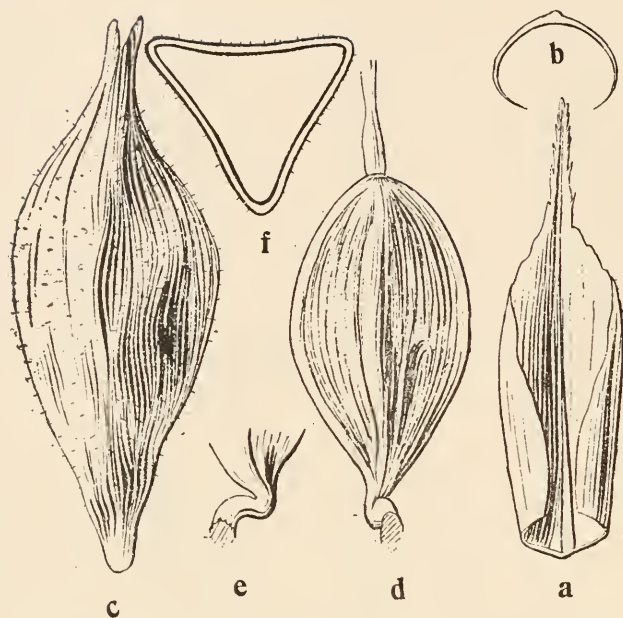


Fig 45, *Carex tatsutakensis* HAYATA  $\times 12$ ; a, a glume; b, section of the same; c, an utricle; d, a nutlet; e, stipe of the same; f, section of the same.

ramosus, foliis caulinis nullis; bracteis basi spiculæ insitis (sed spicula feminea terminalis caulis brevioris haud bracteata), bracteis inferioribus longioribus 7–8 cm. longis spiculas 5–6-plo superantibus, foliiformibus; bracteis basi spiculæ masculinae insitis setæformibus brevioribus spiculas in longitudine æquantibus. Folia tenuiter coriacea 4–5-fasciculata, fasciulis basi squamis ovatis fuscentibus 3–4 instructis, foliis inferioribus longioribus cum vaginis 16 cm. longis cauli longioribus, vaginis plus minus purpureis tubuliformibus 2–3 cm. longis  $1\frac{1}{2}$  mm. latis latere uno fissis vel haud fissis glabris ore obliquis, ligulis brevissimis lamelliformibus integris haud ciliatis, laminis linearibus 10–13 cm. longis  $1\frac{1}{2}$  mm. latis acuminatis margine sub lente scabriusculis supra sub lente vix scabriusculis subtus glabris. Spiculæ in cauli longiore circ. 3 versus apicem caulis approximativè dispositæ; terminalis masculina; lateralibus femineis; spicula in caule longiore masculina terminalis cylindrica erecta 1 cm. longa, bracteolis obsoletis, squamis totis fertilibus quam squama spiculæ femineæ longioribus; spicula feminea lateralis pedicellata, pedicellis 3–5 mm. longis complanatis latere hirsutis erectis ad basin bracteis singulis et bracteolis singulis instructis; bracteis foliiformibus inferioribus longissimis 8 cm. longis quam spicula multo longioribus, superioribus 2–3 cm. longis; bracteolis ad basin pedicelli singulariter sitis paleiformibus linearibus  $2\frac{1}{2}$  mm. longis  $\frac{1}{2}$  mm. latis apice truncatis hyalinis ecoloratis basin pedicelli semiamplectantibus; squamis (glumis) spiculæ femineæ totis fertilibus mediis elongato-

ramosus, foliis caulinis nullis; bracteis basi spiculæ insitis (sed spicula feminea terminalis caulis brevioris haud bracteata), bracteis inferioribus longioribus 7–8 cm. longis spiculas 5–6-plo superantibus, foliiformibus; bracteis basi spiculæ masculinae insitis setæformibus brevioribus spiculas in longitudine æquantibus. Folia tenuiter coriacea 4–5-fasciculata, fasciulis basi squamis ovatis fuscentibus 3–4 instructis, foliis inferioribus longioribus cum

oblongis 4 mm. longis 2 mm. latis apice acutis basi haud contractis rhachiu spiculae complete amplexantibus dorso prominente carinatis, carinis apice ad setulam 1–2 mm. scabram abeuntibus. Utriculus obovoideo-fusiformis  $5\frac{1}{2}$ –6 mm. longus 2 mm. latus trigonus facie concavus apice subito attenuatus ad summum breve bi-dentatus basi gradatim acuminatus brevissime hirsutus, pilis  $\frac{1}{10}$  mm. longis transverse patentibus. Nucula obovoidea trigona facie concava ad angulos prominente carinata apice obtusa basi triangulari-acuta stipitata, stipite  $1\frac{1}{3}$  mm. longo cum utriculo fere perfecte connato apice libero et geniculatim recurvo, stylo basi leviter incrassato medio sursum 3-fido, ramis gracilibus crispato-recurvis.

HAB. Musha : Tatsutaka, ad 7000 ped. alt., leg. W. R. PRICE, No. 797.

The culms of this new species appear to be always in pair which are supported by a single fascicle of leaves at their base; but in reality, they are not in pair. That they appear to be in pair, is due to the fact that a single culm bears a single branch at its very base.

**Carex Morii** HAYATA sp. nov.  
(Fig. 46). Folia radicalia ignota. Caulis erectus circ. 80 cm. longus acute triquetris gracillimus 1–1 $\frac{1}{2}$  mm. latus glaber. Folia caulina inferiora a se 15–30 cm. distantia linearia cum vaginis 25 cm. longa, vaginis atro-purpureis 2–4 cm. longis nitidis triquetris prismaticis 3–4 mm. latis ore obliquissimis apice gradatim ad limanum abeuntibus, laminis planis circ. 20 cm. longis 4 $\frac{1}{2}$  mm. latis apice acuminatis coriaceis margine integris scabris facie scabris; folia caulina basi ramos 1–2 amplexantibus, ramis gracillimis erectis. Spiculae ad apicem caulis vel ramorum laxè paniculatim dispositae, paniculis in circumscriptione linearibus circ. 25 cm. longis 4 cm. latis,

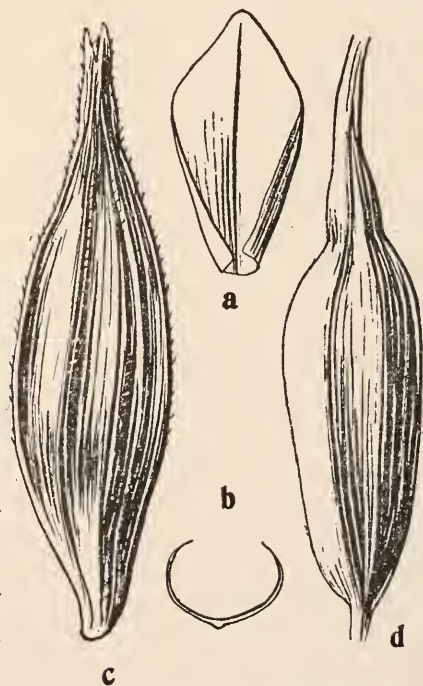


Fig. 46, *Carex Morii* HAYATA  $\times 12$ ; a, a scale; b, the same in section; c, an utricle; d, a nutlet.

pedicellis spiculæ gracillimis  $\frac{1}{2}$ –2 cm. longis, bracteis sub ramo sitis castaneo-coloratis vaginiformibus 1–1 $\frac{1}{2}$  cm. longis apice setæformibus. Spiculæ inferiores bisexuales, superiores masculinæ; spicula masculina lineari-cylindrica plus minus recurva 2–3 cm. longa 1 $\frac{1}{2}$  mm. lata apice acuminata basi obtusa, squamis inferioribus sterilibus; squamis mediis ovatis 4 $\frac{1}{2}$  mm. longis 2 mm. latis apice acutis; stamina 3, filamentis glabris, antheris linearibus 2 mm. longis  $\frac{1}{3}$  mm. latis apice ad connectivum brevissime productis, partibus productis subacutis, basi auriculis brevissimis; spiculæ bisexuales obovatæ brevissime pedicellatæ 5 mm. latæ pauci-floratæ; fl. ♀ mediæ: squamis (glumis) ovatis 3 $\frac{1}{2}$ –4 mm. longis 2 mm. latis utriculo brevioribus apice acutis obtusis vel cuspidatis margine integris basi perfecte rhachin utriculi amplexantibus glabris dorso 1-costatis. Utriculus fusiformis 6 $\frac{1}{2}$  mm. longus 1 $\frac{1}{2}$  mm. latus apice rostrato-attenuatus ad summum 2-dentatus basi breve attenuatus dorso convexus facie concavus utraque hirsutus tenuiter multo striatus. Nucula elongato-obovoideo-elliptica 3 $\frac{1}{2}$ –4 mm. longa 1 $\frac{1}{2}$  mm. lata lævis dorso convexa facie plana apice abrupte rostrata ad stylum abeuns.

HAB. Formosa, loco non indicato, leg. U. MORI, 1912.

## Gramineæ.

### *Arundinaria* MICH.

***Arundinaria Kunishii* HAYATA** sp. nov. (Fig. 47). Frutex. Rhizoma repens circ. 40 cm. longum 1 $\frac{1}{2}$  cm. in diametro plus minus recurvum, internodiis 2–2 $\frac{1}{2}$  cm. longis, squamis complete obtectum, squamis stramineis glabris 5 cm. longis apice triangulari-obtusis interdum 2-fidis complete rhizoma amplexantibus. Turio erectus rectus e rhizomate lateraliter oriundus deorsum purpurascens sursum viridescens sparse hirsutus nitidus. Culmus

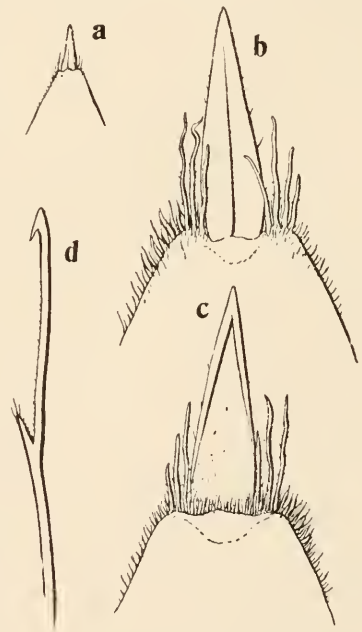


Fig. 47, *Arundinaria Kunishii* HAYATA; a, an apical portion, a sheath of turion; b, the same, magnified seen from surface; c, the same, seen from back; d, the same, in vertical section; a, natural size; others magnified.

erectus rectus 6 m. altus, 2 cm. in diametro; vagina decidua purpurea apice attenuata primum ad summum truncata sparse hirsuta demum glabra nitida margine ciliata apice utroque latere auriculis minutis et setis auricularibus instructa, pseudophyllis lineari-triangularibus 5 mm. longis 4 mm. latis apice acuminatis, ligula brevissima villosa; merithallium nitidum medium 25 cm. longum 9 mm. latum; lignum  $1\frac{1}{2}$  mm. crassum; canalis  $5\frac{1}{2}$  mm. in diametro; pulvillus inferior prominente annuliformis, pulvillus superior tenuiter elevatus, pulvilli a se 7 mm. distantes; squama bicarinata bifida subglabra. Rami ternatim siti simplices vel pauciramulosi, ramulis 3-5-10-foliatis; vaginella valde imbricata 5-10 cm. longa complanata ore truncata, setis auricularibus utroque latere circ. 10 erectis rectis vel crispatis; ligula brevissima hirsuta. Folia lineari-lanceolata 15-24 cm. longa 2- $3\frac{1}{2}$  cm. lata apice subito acuminatissima basi abrupte ad petiolum 5-7 mm. longum abeuntia margine sursum latere uno hirsuta latere imo scabra, nerviis secundariis utroque latere costæ 7-11, venulis inter nervos secundarios 7.

HAB. Nantō: Rinkiho et Rōsukō, Aprili. 1916, leg. B. HAYATA; Kagi: Shōkoshō, culmus 10 m. altus  $2\frac{1}{2}$  cm. in diametro.

Near *Arundinaria japonica*, but differs from it in having ternate branches, and in having shining vaginas of the turions. The vaginas of *A. japonica* is quite lusterless.

***Arundinaria niitakayamensis*** HAYATA in Tōkyō Bot. Mag. XXI. p. 49 et Fl. Mont. Formos. p. 240.

*Sasa niitakayamensis* CAMUS Bambus. (1913) p. 24.

In our species, the stamens are usually in three, and the branches are always ternate,—characters quite assignable to *Arundinaria*, but not to *Sasa*. As Monsieur CAMUS gave no comment, I can not understand on what ground did he transfer this species to *Sasa*.

***Arundinaria oiwakensis*** HAYATA sp. nov. (Fig. 48). Frutescens. Rhizoma horizontaliter sympodialiterque repens, partibus novellis squamis imbricatis obtectis, 5 mm. crassum, radicibus teretibus incrassatis 4 mm. in diametro. Turio erectus rectus purpurascens hirsutus multistriatus, striis viridescentibus, pilis albis vel fulvescentibus caducissimis obtectus; vaginæ mediæ turionis subcoriaceæ caduæ dorso hirsutæ instus glabræ nitidæ basi ad insertionem dense



villosa-hirsutæ margine ciliolatæ; pseudophyllis minutis linearibus vel triangulari-linearibus 7-8 mm.-25 mm. longis basi  $1\frac{1}{2}$  mm. latis extus glabris intus basi hirsutis semper deflexis intus canaliculatis; auriculis nullis; ligula lineari-triangularis erecta recta apice fimbriato-ciliata cum ciliis 5-10 mm. longa, ciliis validis 3-4 mm. longis erectis subrectis sub lente hirsuto-scabridis. Culmus distante situs rectus erectus 300 cm.-440 cm. altus, parte inferiore non ramifera 130 cm.-140 cm. longa 9 mm. in diametro, teres haud striatus; merithallium inferius 23 cm. longum 8 mm. in diametro. lignum 2 mm. crassum; canalis medullaris 3 mm. in diametro; inferior pulvillus infundibulari-prominens elevatus, superior pulvillus leviter elevatus, pulvilli a se 4-5 mm. distantes; squama bicarinata usque ad basin æqualiter bifida 2 cm. longa ad carinas hirsuta cæterum glabra. Rami multo-fasciculati 60 cm. longi haud solidi foliiferi; ramuli tenuissimi 3-5-foliiferi. Folia lineari-lanceolata 8-15 cm. longa  $1-1\frac{1}{2}$  cm. lata apice acuminata acuminatissima basi triangulari-cuneata ad petiolum brevissimum abeuntia margine scabra, nervis secundariis 2-3-pariis, nervulis 8 inter secundarios; vaginella 4-6 cm. longa, setæ auriculares 8-10 erectis rectis scabris; ligula oblonga  $1\frac{1}{2}$  mm. longa obtusissima hirsuta. Inflorescentia cum ramis foliiferis intermixta ad apicem ramuli terminalis. Spiculæ 7-10 laxè paniculatim dispositæ longe pedicellatæ. Spicula matura non visa.

HAB. Musha-Oiwake, ad 7000 ped. alt., leg. B. HAYATA, Aprili. 23, 1916.

Very near *A. nitakayamensis* HAY., perhaps a form of the latter.

**Arundinaria Usawai** HAYATA sp. nov. (Fig. 49). Rhizoma longe repens lateraliter turiones gerens 8 mm. in diametro. Turio erectus rectus



Fig. 48, *Arundinaria oiwakensis* HAYATA; a, a sheath of a turion; b, the same, seen from surface; c, the same, seen from back; a, natural size; others magnified.



purpurascens haud nitidus opacus; vagina media purpurascens opaca haud nitida scabra pilis brevissimis fusco-purpureis triangulari-formibus adpresse conspersa margine sursum ciliolata; setæ auriculares utroque latere apicis vaginæ 4-5 sitæ rectæ erectæ hirsutæ; ligula brevissime hirsuta; pseudophyllis minutis longe triangularibus 4 mm. longis  $1\frac{1}{2}$  mm. latis apice acuminatis. Culmus distans 3 m. altus prope basin 1-1 $\frac{1}{2}$  cm. in diametro toto vaginis persistentibus obtectus, partibus non ramiferis 110 cm. longis; merithallium inferius 25 cm. longum 14 mm. in diametro, pulvillis a se 7 mm. distantibus, pulvillis inferioribus prominente annuliformibus, pulvillis superioribus haud vel vix prominentibus; lignum 3 mm. crassum; canalis medullaris 7 mm. in diametro; squama bicarinata 2-fida, segmentis linearibus 15 mm. longis ad carinas hirsutis. Rami ternati vaginati, centrale majore, laterales minores. Ramuli vaginati vel interdum nudi 1-2-foliati; vaginella circ. 5 cm. longa glabra apice utroque latere auriculis minutis et setis auricularibus instructa, ligula minuta fimbriata hirsuta. Folia lineari-lanceolata 11-31 cm. longa 13-43 mm. lata apice acuminatissima basi plus minus oblique obtusa ad extremitatem subito cuneata ad petiolum 2-5 mm. longum abeuntia margine scabra, nervis secundariis utroque latere costæ 5-8, nervulis inter secundarios 7-10.

HAB. Shishitao ad 2000 ped. alt., leg. B. HAYATA, Aprili. 1916. typus!.

Near *A. japonica*, but differs from it by the ternate branches on the culms and by the not hairy scabrous lusterless persistent sheaths.

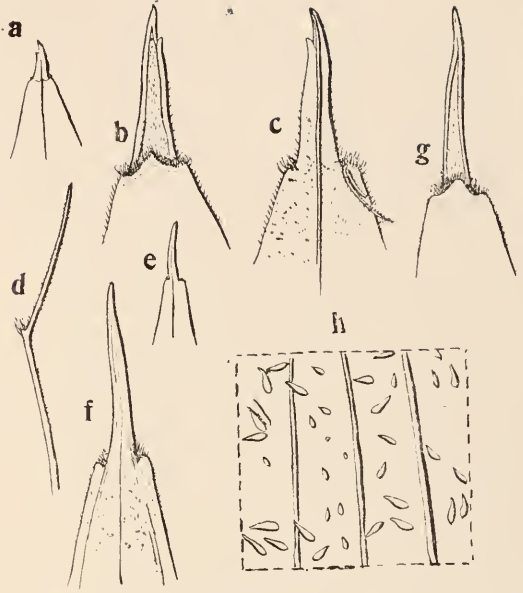


Fig. 49, *Arundinaria Usawai* HAYATA; a, a sheath of a turio; b, the same seen from back; c, the same seen from surface; d, vertical section of the same; e, another sheath; f, the same seen from surface; g, the same, seen from back; h, hairs on the surface; a and e, natural size; others more or less magnified.

*Phyllostachys* SIEB. et ZUCC.

***Phyllostachys pubescens*** H. LEHAIE Nat. Syst. Bamb. in Act. III. Congr. Int. Bot. p. 233 tt. 55-57.

*Phyllostachys mitis* RIV.; MATSUM. Ind. Pl. Jap. II-1 p. 94.

HAB. Rōsuikō, cult., leg. B. HAYATA, Aprili. 1916.

Note:—Rhizome repens, culms distant, erect, side branches single or in pairs.

***Phyllostachys formosana*** HAYATA sp. nov. (Fig. 50). Arborescens vel frutex. Rhizoma repens; turio purpurascens plus minus maculatus glaber, vagina medio margine haud ciliolata glabra tenuiter membranacea apice abrupte ad pseudophyllum abeuns truncata, partibus truncatis 1 cm. latis, apice haud auriculata setulis auricularibus nullis; ligula subnulla; pseudophyllum



Fig. 50, *Phyllostachys formosana* HAYATA; a, apical portion of a sheath of a turion, seen from surface; b, the same, seen from back; c, vertical section of the same; natural size.

lineare 16 cm. longum 3 mm. latum apice acuminatum margine undulatum et interiore recurvum. Culmus distans 7 m. longus a basi usque ad 2 m. altitudinem  $3\frac{1}{2}$  cm. in diametro, rotundatus in sectione, canalis  $2\frac{1}{2}$  cm. in diametro; lignum  $\frac{1}{2}$  cm. crassum; merithallium in 2 m. altitudinem mediocriter 10 cm. longum valde variabile interdum irregulare ut *Bambusa heteroclada*; pulvillus inferior distincte elevatus annuliformis, pulvillus superior tenuissime elevatus a iis inferioribus 3 mm. distans; merithallium ramiferum in sectione  $\square$ -forme, ramis solitariis vel geminis. Ramuli graciles 1-2-foliati; vaginella 3 cm. longa 1 mm. lata latere convoluta-imbricata latere sursum ciliolata apice pubescens, auriculis inaequalibus, una majore una minore, semi-rotundatis hirsutis, ligula minuta hirsuta, setis auricularibus non existis. Folia lanceolata vel lineari-lanceolata 8-12 cm. longa 17 mm. lata apice acuminata basi obtusa ad petiolum 3-5 mm. longum abeuntia margine scabra, nervis secundariis utroque latere

costæ 4-5, venulis inter secundarios 7.

HAB. Rinkiho: Daikōshō, leg. B. HAYATA, Aprili. 2, 1916.

Near *P. aurea*, but differs from it by the turions with purple maculated vaginæ and in the absence of the auricular setæ.

**Phyllostachys lithophila** HAYATA sp. nov. (Fig. 51). Arboreseens.

Rhizoma horizontaliter longe repens teres  $2\frac{1}{2}$  cm. in diametro. Turion glaber fulvo-purpurascens plus minus maculatus striatus, squama media apice obtusa vel acuta, partibus apicaribus cum pseudophyllo æquilatis, apice margine hirsuta; ligula brevissima  $\frac{1}{2}$  mm. longa apice truncata hirsuta; pseudophyllum triangulari-lineare in specimine nostro 8 mm. longum 3 mm. latum basi gradatim latius laud contractum utraque glabrum, partibus basilaribus carnosius intus hirsutis. Culmus minutissime striatus distans erectus rectus 15 m. altus. Merithallium in 2 m. altitudine  $4\frac{1}{2}$  cm. in diametro perfecte circulare in sectione; lignum 6-7

mm. crassum; canalis medullaris 3 cm. in diametro; pulvillus inferior acute tenuiter elevatus, pulvillus superior obscure tenuissime elevatus, pulvillis a se 4 mm.

distantibus. Rami gemini vel solitarii; ramuli 1-3-foliati,

vaginella 3-4 cm. longa apice hirsuta, setis auricularibus paucissimis generaliter obsoletis nullis; ligula membranacea cylindrica 2 mm. longa uno latere fissâ hirsuta. Folia lineari-lanceolata 10-20 cm. lata apice acuminatissima basi rotundata vel cuneata ad petiolum 2-7 mm. longum abeuntia supra glabra subtus basi hirsuta cæterum glabra, margine uno levi, uno scabro, nervis secundariis utroque latere costæ 5-6, venulis inter secundarios 9-10.

HAB. Rinkiho: Chōrin, leg. B. HAYATA, Aprili. 1916.

Near *P. Makinoi* HAYATA, but differs from it in having vaginæ passing

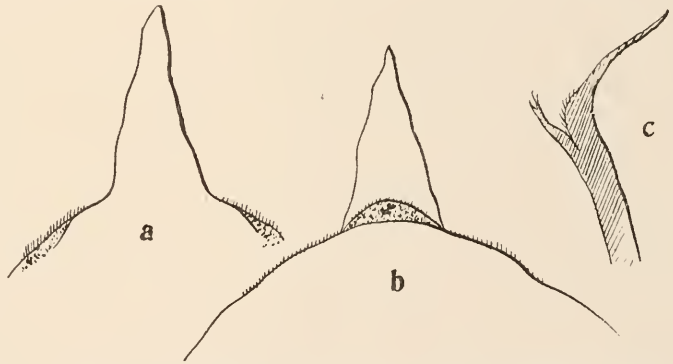
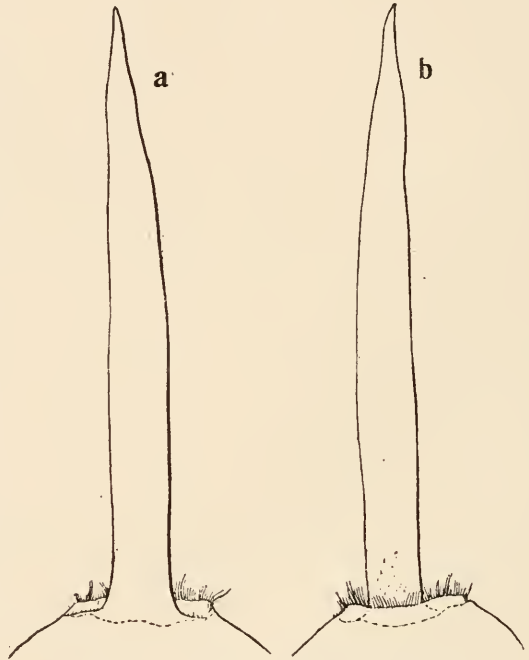


Fig. 51, *Phyllostachys lithophila* HAYATA; a, an apical portion of a sheath of a turion; b, the same, seen from within; c, the same in vertical section; all figures magnified.

to the pseudophylla which are very much smaller than those of *P. Makinoi* and in the absence of the auricular setæ in the leaves. Turions of this new species are much paler than those of *P. Makinoi*.

**Phyllostachys Makinoi** HAYATA (Fig. 52) Ic. Pl. Formos. V. p. 250. Descriptio aucta: Arborescens. Rhizoma repens teres vel complanatum 2 cm. in diametro. Turio fusco-purpurascens; vagina purpureo-maculata apice obtusa subito truncata, partibus truncatis quam basi pseudophylli duplo latioribus, apice haud auriculata haud setosa; ligula lata quam pseudophyllum duplo latior, extus pubescens intus glabra nitida apice truncata in specimine nostro 20-7 mm. lata 2 mm. longa; pseudophyllum lineari angustum in specimine nostro 2-8 cm. longum  $3\frac{1}{2}$ -8 mm. latum apice acuminatum basi latissimum supra basin subito contractum glabrum. Culmus rectus erectus 15 m. altus.



HAB. Rinkiho: Rōsuikō,  
leg. B. HAYATA, Aprili. 2, 1916.

Fig. 52, *Phyllostachys Makinoi* HAYATA; a, a sheath of a turion, seen from without; b, the same, seen from within; natural size.

**Phyllostachys nigripes** HAYATA sp. nov. (Fig. 53). Rhizoma repens teres 6 mm. in diametro fuscens. Turio deorsum purpurascens sursum viridis glaber; vagina media in specimine nostro 4 cm. longa  $1\frac{1}{2}$  cm. lata apice membranaceo-coriacea apice obtuso-truncata quam basis pseudophylli latior margine ciliolata, auriculis nullis; ligula  $\frac{2}{3}$  mm. longa intus glabra extus hirsuta apice truncata hirsuta. Pseudophyllum lineari-triangulare 9 mm. longum  $2\frac{1}{2}$  mm. latum. Culmus gracilis fusco-purpurascens 100 cm. altus. Merithallium medium 13 cm. longum  $4\frac{1}{2}$  mm. in diametro in sectione  $\bigcirc$  forme uno latere sulcatum; pulvillus inferior annulariter prominens, is superior plus acute prominens a

eo inferiore  $1\frac{1}{2}$  mm. distans, nodiis valde prominentibus; squama bicarinata longe linearis 2–3 cm. longa 1–2 mm. longa extus hirsuta. Rami generaliter gemini; ramuli 3-foliati; vaginella  $2\frac{1}{2}$  cm. longa glabra, setis auricularibus utroque latere apicis 4–5 circ. 6 mm. longis; ligula obtusa 1 mm. longa obtuso-truncata extus hirsuta intus glabra apice eroso-ciliolata. Folia linearilanceolata 8–9 cm. longa 11–14 mm. lata apice acuminatissima basi obtusa ad petiolum 4–7 mm. longum abeuntia supra glabra subtus prope basin costæ hirsuta cæterum glabra margine uno latere scabra uno latere glabra, nervis secundariis utroque latere 4–5, venulis inter secundarios 9–10.

HAB. Rōsuikō: Yūshakō, leg. B. HAYATA, April. 5, 1916.

Near *P. puberula* var. *nigra*, but distinguishable from it in having quite glabrous turions.

### *Bambusa* SCHREM.

***Bambusa breviflora*** MUNRO Monograph p. 96; CAMUS Bambus. (1913) p. 118. “Chaume inerme, arborescent? presque plein, dur, brillant, entre-noeuds longs de 13–16 cm.; rameaux fasciculés aux noeuds, les inférieurs noueux à la base, arrondis, simples ou rameux, florifères au sommet, souvent feuillés à la base, mais à feuilles promptement caduques, rameaux du sommet souvent feuillés, mêlés à d’autres florifères nus à la base. Feuilles lancéolées, longues de 4–10 cm. larges de 12–18 mm. arrondies à la base, à pétiole court comprimé, acuminées-sétacées au sommet, à bords rudes à peine dentés, glabrescentes en dessus, hirsutes en dessous, munies de 4–5 paires de nervures latérales visible et d’autres intermédiaires beaucoup [plus faibles; gaines sillonnées, glabres, auriculées, à oreilles ciliées ou parfois longuement fimbriées (18 mm.) Panicule

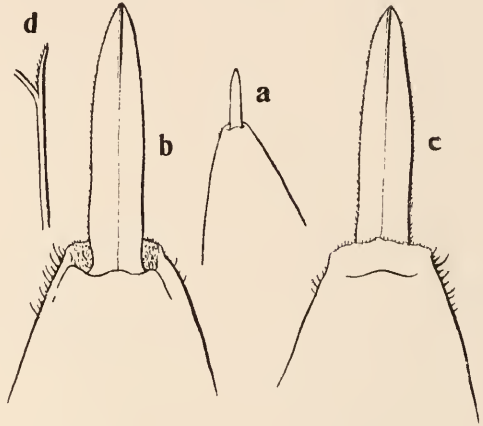


Fig. 53, *Phyllostachys nigripes* HAYATA; a, a sheath of a turion seen from surface; b, the same; c, the same, seen from within; d, the same, in vertical section, showing the ligule; a, natural size; others magnified.



sur des rameaux ou ramuscules terminaux, en épis verticillés, à verticilles formés de peu d'épillets et à peu près équidistants. Epillets brillants livides, courts, au plus de 14 mm. de long, pauciflores, à 5-7-fl., subeylindriques, aigus; rachéole courte, articulée. Fleurs supérieures et inférieures graduellement imparfaites, les moyennes 2-3 hermaphrodites. Fleurs ♂: Glumelle infér. nerviée, glabre, obtuse, souvent mucronée; glumelle supér. dépassant un peu la sup. 2-carénée, à carènes finement fimbriées vers leur sommet, munie de 5-7 nervures entre les 2 carènes. Glumellules non visiblement nerviées, finement fimbriées. Anthères à connectif obtus allongé. Style surmonté par 3 stigmates. Ovaire stipité, obové, hirsute au sommet. Chine, Formose: Tamsuy (OLDHAM), Linthao (CANtero)."

HAB. Mt. Kwannonzan.

**Bambusa dolichoclada** HAYATA sp. nov. (Fig. 54). Rhizoma breve erectum crassum teres  $4\frac{1}{2}$  cm. in diametro. Culmus haud spinosus breve caespitosus 10 cm. altus in 2 m. altitudinem  $4\frac{1}{2}$  cm. in diametro teres circularis in sectione viridis saepe extus albo-cerifer a basi ramifer; ramis inferioribus efoliatis gracillimis longissimis horizontaliter patentibus. Merithallium ad 2 m. altitudinem 30 cm. longum  $4\frac{1}{2}$  cm. in diametro, lignum 8 mm. crassum, canalis 33 mm. in diametro, pulvillus inferior prominens, is superior obscurus; pulvilli a se 7 mm. distantes. Rami ad nodos fasciculati. Vagina media coriacea extus fusco-hirsuta 24 cm. longa 28 cm. lata margine versus apicem tenuiter hirsuta apice late truncata, partibus truncatis 16 cm. latis plus minus rotundatis vel fere truncatis; ligula brevissima apice fimbriato-ciliata; pseudophyllum elongato-triangulari 17 cm. longum 16 cm. latum, basi cum partibus truncatis vaginæ æquilatum, basi subito latius supra basin ad marginem valde undulato-crispato-plicatum hic ibidem longe setoso-barbatum extus subglabrum intus basi dense hirsuto-barbatum; vaginella  $5\frac{1}{2}$ -7 cm. longa 2-3 mm. lata glabra apice auriculis conspicuis setulosis utroque latere instructa, ligula brevissima truncata extus hirsuta  $\frac{1}{2}$  mm. longa haud ciliolata. Folia lineari-lanceolata 9-18 cm. longa 13-23 mm. lata apice acuminatissima basi subito rotundato-truncata abrupte ad petiolum  $1\frac{1}{2}$ -2 mm. longum abeuntia margine scabra supra glabra supra prope latus unum scabra subtus tenuiter hirsuta, nervis secundariis utroque latere costæ 5-7, venulis inter secundarios 8-9 haud tessellatis.



Fig. 54, *Bambusa dolichoclada* HAYATA; a, apical portion of a sheath of a turion, seen from without; b, another portion of the same; c, the same, seen from within; d, the same, in vertical section; all figures natural size.

HAB. Rinkiho: Aprili. 1916, B. HAYATA.

Near *B. stenostachys* HACK., but distinguishable from it by the much larger leaves, and in the unarmed branches and thinly ceriferous culms. The

flowers of this species are much larger than those of *B. stenostachys* HACK.

***Bambusa dolichomerithalla* HAYATA** sp. nov. (Fig. 55). Frutex.



Fig. 55, *Bambusa dolichomerithalla* HAYATA; a, a portion of an inflorescence; b, a flower; c, a glume of the same flower, seen from the outer side; d, the same, seen from the inner side; e, cross section of the same; g, an apical portion of the same; h, a valva, seen from the outer side; i, the same, seen from the inner side; j, cross section of the same; k, an apical portion of the same; l, m, stamens; n, o, apical portions of the different stamens; p, a lodicule; q, an ovary; r, basal portion of a vagina; s, longitudinal section of the same; a, natural size b, c, d, e, h, i,  $j \times 2$ ; l, m  $\times 3$ ; p  $\times 6$ .

Rhizoma teres 3 cm. in diametro, internodiis 7–15 mm. longis, erectum crassum breve. Culmus erectus rectus cæspitosus in 2 m. altitudinem  $4\frac{1}{2}$  cm. in diametro 10 m. altus cum ramis ramulisque perfecte teres, partibus non ramiferis 6 m. longis. Merithallium medium vel inferius 25–60 cm. longum  $2\frac{1}{2}$  in diametro viride vel albo-striatum, pulvillus inferior tenuiter elevatus duplicato-annulariformis, pulvillus superior obscurrimus haud elevatus a eo inferiore 1 cm. distans; lignum  $2\frac{1}{2}$  mm. crassum; canalis 2 cm. in diametro. Vagina coriacea 10 cm. longa 7 cm. lata apice late rotundata cum pseudophyllo juncta sparse hirsuta, pilis deciduis; pseudophyllo sub-membranaceo oblongo-triangulari 11 cm. longo 6 cm. lato apice acuminato basi plus minus contracto; ligula subnulla haud hirsuta. Rami ad nodos dense fasciculati, ramulis elongatis 5–8-foliatis, vaginella  $3\frac{1}{2}$ – $7\frac{1}{2}$  cm. longa  $1\frac{1}{2}$ – $2\frac{1}{2}$  mm. lata, auriculis interdum conspiciene evolutis interdum haud evolutis, setis auricularibus interdum evolutis interdum haud visis, ligula brevissima truncata interdum crenulata. Folia lineari-lanceolata 9–27 cm. longa 1–3 cm. lata apice acuminata basi rotundata cuneata, ad petiolum 1–2 mm. longum abeuntia supra glabra subtus hirsuta vel subglabra, nervis secundariis utroque latere costæ 3–7, venulis inter secundarios 4–8. Inflorescentia cum foliis interdum intermixta vel interdum haud mixta. Rami floriferi simplices haud ramosi, inferiores 1 m. longi. Spiculæ ad nodos solitariae alternæ sessiles bractea singula caducissima involutæ lineari-lanceolatæ complanatæ 5–6 cm. longæ 1 cm. latæ pallido-virides glabræ nitidæ teretes 7–8-floratae. Glumæ inferiores non floriferae; valva (=gluma florifera) floris medii ovato-oblonga 2 cm. longa 11 mm. lata apice acuta convoluta utraque glabra. Palea plicata in plicato lineari-lanceolata apice acuminata in summo obtusa ciliata 2-carinata ad carinam setuloso-ciliolata extus glabra intus minute hirsuta secus carinam plicata, partibus plicatis medio 3 mm. latis, margine sursum minute ciliolata. Stamina 6, antheris pendulis linearibus 12 mm. longis apice attenuatis ad summum emarginatis basi sagittato-2-lobatis, lobis 1 mm. longis; lodiculis 3 obovato-cuneatis hyalinis nervosis apice triangulari-acutis erosus haud fimbriatis. Ovarium obovoideum stipitatum cum stipite 2–3 mm. longum  $1\frac{1}{2}$  mm. latum patento-hirsutum, stigmatibus 3 filiformibus hirsutis.

HAB. Yūsukō, ad 3000 ped. alt., leg. B. HAYATA, Aprili. 1916; (sp. fl. et fol.); Rōshinkōshō: Kwaikyōzan, leg. B. HAYATA, Aprili. 1916. Culmus

7 m. altus ad 2 m. altitudinem  $3\frac{1}{2}$  cm. in diametro.

Near *Bambusa vulgaris*, but differs from it by the nearly solitary and much longer spikelets. Also near *B. nana* var. *normalis*, but distinguishable from it by the much longer, internodes, spikelets and leaves.

**Bambusa Fauriei** HACKEL (Fig. 56); MATSUM. et HAYATA Enum. Pl. Formos. p. 549.

**Bambusa liukiensis** HAYATA sp. nov.

Frutex. Rami graciles, ramulis 3-5-foliatis, vaginella 2-3 cm. longa glabra apice auriculata, auriculis oblongo-triangularibus 1 mm. longis  $\frac{1}{2}$  mm. latis apice obtusis oblique prominentibus margine setosis, setis 5 mm. longis scabris, ligula brevissima  $\frac{1}{2}$  mm. longa integra truncata. Folia lanceolata 5-7 cm. longa 8-11 mm. lata apice acuminatissima basi oblique rotundata vel obtusa ad petiolum 1 mm. longum abeuntia margine supra glaberrima subtus glaucissima tenuissime hirsuta margine scabra, nervis secundariis utroque latere costæ 4-5, venulis inter secundarios 7-8 haud tessellatis. Paniculae compositæ, ramis fasciculatis, bractea ignota. Spiculae lineari-fusiformes 2 cm. longæ ad nodos solitariae vel 2-3-fasciculatae sessiles, floribus perfectis 3 et eo imperfecto 1; glumæ non-floriferae inferiores minutæ superiores majores; valva (gluma florifera) 12 mm. longa nervosa glabra fere convoluta acuta; palea plicata in plicato 10 cm. longo  $1\frac{3}{4}$  mm. lata apice bifida, lobis acuminatis 2 mm. longis, dorso 2-carinata ad carinas hirsuta, inter carinas glabra, partibus plicatis  $1\frac{1}{2}$  mm. latis. Stamina 6, antheris linearibus 6-7 mm. longis 1 mm. latis apice brevissime 2-lobatis basi sagittato-2-lobatis,

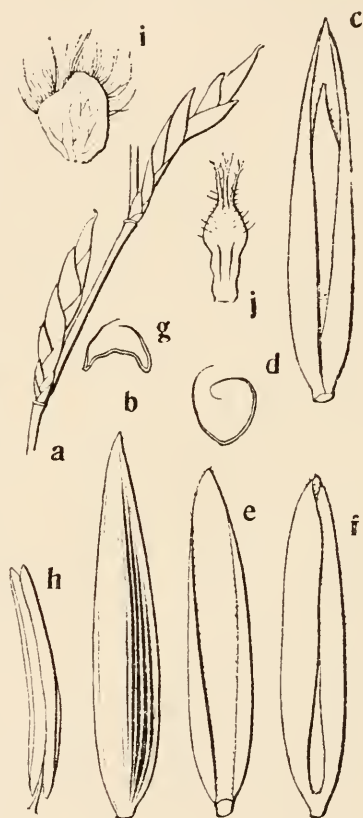


Fig. 56, *Bambusa Fauriei* HACK.

a, a portion of the inflorescence; b, a glume of a flower, seen from the outer side; c, the same, with a valva, seen from the inner side; d, cross section of the same; e, a valva, seen from the outer side; f, the same, seen from the inner side; g, the same, in cross section; h, a stamen; i, a lodicule; a, natural size; b, c, e, f  $\times 4$ ; i, j  $\times 6$ .



lobis 1 mm. longis; lodiculæ obovatæ  $2\frac{1}{2}$  mm. longæ 1 mm. latæ apice triangulari-acuminatæ fimbriatæ basi cuneatæ. Ovarium obovoideum  $1\frac{1}{2}$  mm. longum 1 mm. latum apice globosum basi longe cuneatum sursum glabrum deorsum hirsutum, stigmatibus 3 filiformibus fimbriatis.

HAB. Liu-kiu, secus rivulas crescens, leg. J. MATSUMURA.

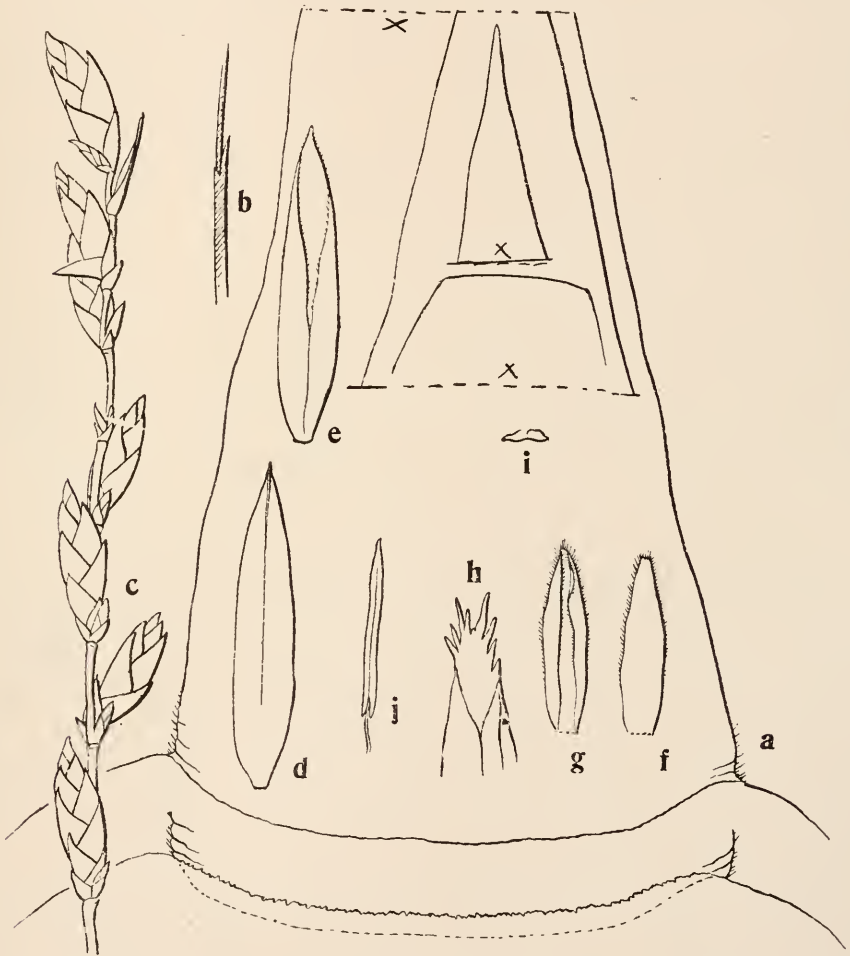


Fig. 57, *Bambusa Oldhami* MUNRO; a, a sheath of a turion, seen from the outer surface; a', basal portion of the same, seen from the inner side, showing the ligule; b, a portion of the same, in vertical section, showing the ligule; c, a portion of the inflorescence; d, a glume of a flower; e, the same, seen from the inner side; f, a palea of the same flower; g, the same, seen from the inner side; h, apical portion of the same, more magnified; i, cross section of the same valva; j, a stamen; a, b, c, natural size; others  $\times 3$ .

Distinctly differs from *B. nana* ROXB. in having much smaller and shorter spikelets and in having very prominent auricles at the apex of the vaginella.

**Bambusa Oldhami** MUNRO (Fig. 57); MATSUM. et HAYATA, Enum. Pl. Formos. p. 550. Rhizoma erectum breve crassum. Culmus cæspitosus erectus vel plus minus recurvus 12 m. altus; merithallium in  $1\frac{1}{2}$  m. altitudinem 25 cm. longum  $5\frac{1}{2}$  cm. in diametro; lignum 12 mm. crassum; canalis 4 cm. in diametro, pulvillus inferior tenuissime elevatus, partibus inter pulvillum inferiorem et superiorem tenuiter impressis.

HAB. Rinkihō, leg. B. HAYATA, Aprili. 1916.

**Bambusa pachinensis** HAYATA sp. nov. (Fig. 58). Frutex. Rhizoma crassum erectum. Culmus cæspitosus 2 m. altus. Rami fasciculati, ramulis 5-6-foliatis; vaginella  $3\frac{1}{2}$ -5 cm. longa sursum marginique hirsuta deorsum glabra, auriculis inæqualibus palmiformibus 1 mm. latis instructa, auriculis setosis, setis 5-6, 7 mm. longis haud scabris; ligula brevissima  $\frac{2}{3}$  mm. longa extus hirsuta margine erosa. Folia lanceolata vel ovato-lanceolata  $7\frac{1}{2}$ -10 cm. longa 18-20

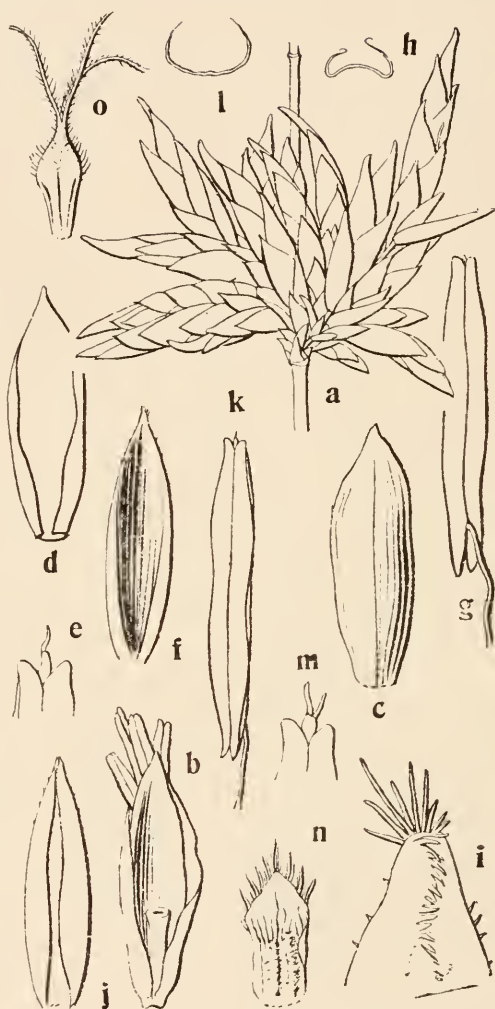


Fig. 58, *Bambusa pachinensis* HAYATA; a, a part of an inflorescence; b, a flower; c, a glume, seen from the outer side; d, the same, seen from the inner side; e, cross section of the same; f, a palea, seen from the outer side; g, the same, seen from the inner side; h, cross section of the same; i, an apical portion of the same; j, k, stamens; l, m, apical portion of different stamens; n, a lodicule; o, an ovary; a, natural size; b, c, d, e, f, g, h  $\times 3$ ; j, k, n, o  $\times 6$  others more magnified.

mm. lata apice acuminatissima basi plus minus rotundata vel leviter cordata ad petiolum  $1\frac{1}{2}$  mm. longum abeuntia margine utroque scabra supra prope costam scabra supra glabra subtus tenuiter hirsuta, nervis secundariis utroque latere costæ 3-5, venulis intersecundariis 7-8 tessellatis, inter venulas pellucido-punctata. Paniculæ compositæ non foliiferæ; spicæ vel spiculæ ad nodos multi- vel pauci-congestæ, basi bractea instructæ; bractea caducissima triangulari-ovata 1 cm. longa 5 mm. lata apice lamina minutissima cuspidato-triangulari  $1\frac{1}{2}$  mm. longa instructa. Spiculæ lineares complanatæ 3-4 cm. longæ 6-7 mm. latæ circ. 8-floriferæ; rhachis minute hirsuta, rhachilla glabra. Valva (gluma florifera) ovata convoluta 13 mm. longa in explicato 10 mm. lata apice acuta extus glabra intus sursum dense hirsuta deorsum glabra valde coriacea nervosa; palca plicata 13 mm. longa coriaceo-membranacea extus ad costas hirsuta cæterum glabra intus sparse hirsuta apice hirsuta. Stamina 6, antheris linearibus 6 mm. longis apice emarginatis mucronatis basi sagittato-lobatis, lobis 1 mm. longis; lodiculæ obovatæ 3 mm. longæ 2 mm. latæ apice rotundatæ margine longe fimbriato-ciliatæ. Ovarium cuneato-obovoideum 2 mm. longum 1 mm. latum apice hirsutum deorsum glabrum, stigmatibus 3 filiformibus hirsutis.

HAB. Pachina, leg. B. HAYATA, Mart. 1916.

Remarkable for the broader bracts which are almost wanting of a lamina.

**Bambusa Shimadai** HAYATA sp. nov. (Fig. 59). Frutex; rami et ramuli fasciculati, ramulis 5-12-foliatis, vaginella  $1\frac{1}{2}$  cm. longa glabra, auriculis subnullis, setis auricularibus 5-6 tenuissimis 1-2 mm. longis; ligula brevissima truncata integra. Folia lanceolata vel lineari-lanceolata 5 cm. longa 6-9 mm. lata apice acuminatissima basi rotundata vel obtusa ad petiolum  $1-1\frac{1}{2}$  mm. longum abeuntia utraque glabra subtus glauca margine scabra, nervis secundariis utroque latere costæ 5, venulis intersecundariis circ. 7, hand tessellata. Ramuli floriferi ad nodos 2-3-congesti remote spiculiferi. Spiculæ generaliter solitariae alternæ a se circ.  $2\frac{1}{2}$  cm. remotæ basi 1-bracteatæ; bracteæ caducæ, vaginellis 1-2 cm. longis, laminis lanceolatis basi abrupte dilatatis cum vaginella æquilatis caducissimis utraque pagine hirsutis. Spiculæ cylindricæ plus minus complanatæ 3-4 cm. longæ 4 mm. latæ, floribus 4-5 a se 4-2 mm. distantibus; glumæ inferiores non-floriferæ minores.

Valva convoluta 2 cm. longa apice acuta utraque pagine glabra nervosa valde coriacea. Palea coriaceo-membranacea 18 mm. lata plicata in plicato lanceolata 18 mm. longa utraque pagine glabra versus apicem carinata secus carinam plicata, partibus plicatis 2 mm. latis versus apicem ad marginem ciliolatis, ad apicem 3-4-setuloso-ciliolata. Stamina 6, antheris linearibus 1 cm. longis apice obtusis emarginatis; lodiculæ 3 inæquales hyalinæ obovato-oblongæ apice acutæ vel obtusæ crossæ. Ovarium fere obovoideum apice hirsutum sessile haud stipitatum; stigmatibus 2-3?

HAB. Sekimenshō, leg. S. SHIMADA, Mart. 1911.

***Bambusa stenostachys***

HACK.; MATSUM. et HAYATA Enum. Pl. Formos. p. 550. Rhizoma erectum crassum. Culmus caespitosus plus minus flexuosus ad 2 m. altitudinem 4 cm. in diametro; lignum  $1\frac{1}{2}$  cm. crassum, canalis 12 mm. in diametro. Merithallium in 2 m. altitudinem 25 cm. longum  $3\frac{1}{2}$  cm. in diametro; pulvillus inferior valde prominente elevatus, pulvillus superior vix elevatus, a se 7 mm. distans; culmus a basi ramosus, ramis spinescentibus.

HAB. Rinkihō, leg. B. HAYATA, Aprili. 1916.

***Bambusa tuldoidea*** MUNRO "Monogr. p. 93;" CAMUS Bambus. p.

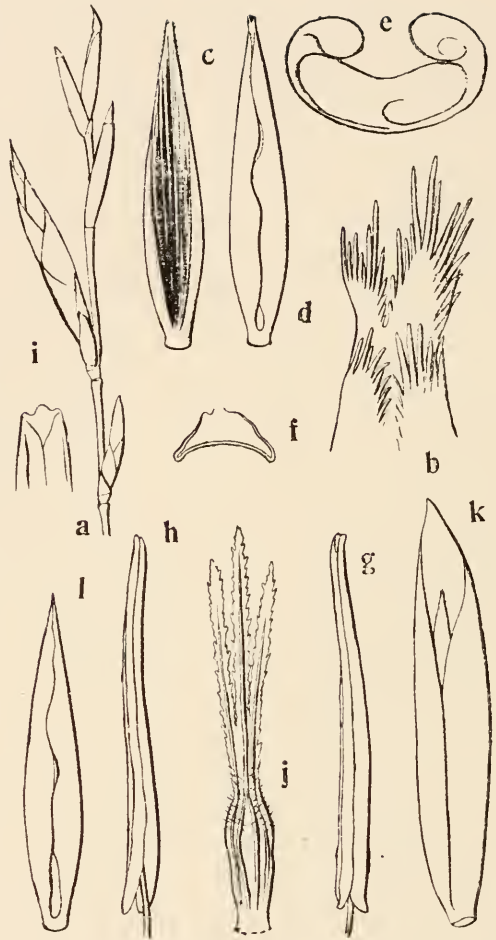


Fig. 59, *Bambusa Shimadai* HAYATA; a, a portion of an inflorescence; b, a flower; c, a palea, seen from the outer side; d, the same, seen from the inner side; d', apical portion of the same; e, cross section of a palea; g, h, stamens; i, an apical portion of a stamen; j, an ovary; a, natural size; others more or less magnified.

117.—“Chaumes à peine arborescents, fistuleux, à rameaux feuillés, à entrenœuds sillonnés-striés. Feuilles de ces rameaux, longues de 12–20 cm. larges de 15–20 mm. lanceolées, arrondies à la base, pétiolées, à bords denticulés, à dents éloignées surtout vers la base, glabres en dessous, mais à toucher rude sur les bords, un peu poilues en dessous; nervures secondaires 6–8 paires, peu distinctes; gaines ciliées vers le sommet et munies de 2 auricules ciliées et fimbriées, feuilles de la panicule de même forme mais plus petites, atténuées à la base; à gaines non munies d'auricules fimbriées et ciliées comme les autres feuilles. Inflorescence en panicule feuillée, à rachis glabre, brillant dur, arrondi, de 6–8 mm. de diam., cette panicule lâchement composée, très rarement simple, à rameaux très inégaux subverticillés; les supérieurs 1–3, les inférieurs groupés par 5–6; entrenœuds inférieurs scabriuseules au sommet. Epillets pâles, non brillants, membraneux, cylindriques un peu comprimés plus ou moins espacés, rarement agglomérés densément, longs de 25–30 mm. 4–8-flores, la fleur inférieure et les supérieures incomplètes. Rachéole à la fin visible, brièvement hirsute à sa partie supérieure. Glumes petites, ovales-aiguës, à nervure médiane un peu forte. Fleurs ♂: Glumelle inférieure sub-obtuse au sommet, brusquement mucronée; glumelle supérieure presque aussi longue ou beaucoup plus courte que l'inf. acuminée, terminée par un fascicule de poils, à carènes brièvement ciliées au sommet. Glumellules 3, obovales, obtusiuscules, finement fimbriées. Etamines à anthères obtuses. Style très court. Stigmates 3, ténus. Ovaire stipité presque obovale, hirsute au sommet, couronné par les débres du style et des stigmates. Caryopse de 5 mm. de long, obtus, presque glabre.”

“Chine: Canton, Hongkong, Formose, Tonkin.”

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There are yet two more species of Bamboos in Formosa; one is very near to a small form of *B. dolichomerithalla*, and the other is a species with leaves much like those of *B. Oldhami* and with turion-sheath much like those of *Phyllostachys edulis*.



## Marattiaceæ.

*Archangiopteris* CHRIST et GIESENHAGEN.

**Archangiopteris Somai** HAYATA (Pl. XIX et fig. 60) Ic. Pl. Formos. V. p. 256. Rhizoma crassum breve horizontaliter situm subrepens reliquis stipularum et basibus stipitum approximatin obtectum, radicibus e facie inferiore rhizomatis abundanter oriundis incrassatis teretibus. Stipes circ. 50 cm. longus plus minus squamatus (squamis castaneis lanceolatis membranaceis acuminatis basi subcordatis 2-3 mm. longis) a basi ad 20 cm. altitudinem articulo-geniculatus ad hic ibidem tumido-incrassatus, basi ad extremitatem subito incrassatus in exsiccatō fusco-nigricans stipulis amplis semi-rotundatis sublignosis instructus. Frons in circumscriptione ovata herbaceo-membranacea vel herbaceo-coriacea margine deorsum recurva supra atro-viridis haud nitida plus minus variegata subtus pallidissima 40 cm. longa 25 cm. lata pinnata, pinna 4-6; pinna terminali lanceolata 30 cm. longa apice subito acuminatissima, acumine lineari basi 3-4 mm. lato, basi obtusa margine a basi usque ad prope acumen regulariter crenulata (crenulis  $\frac{1}{2}$  mm. longis 1 mm. latis) ad basin acuminis dentata, (dentibus ascendentibus apice obtusis  $1\frac{1}{2}$  mm. longis), utraque pagine glabra, venis lateralibus simplicibus vel a basi furcatis, venulis parallelis a costa circ. angulo  $90^\circ$  divaricatis plus minus superiore recurvis a se 2-3 mm. remotis simplicibus distinctis haud elevatis haud impressis ad marginem fere attingentibus vel prope marginem evanescentibus apice haud clavatis, venulis recurrentibus nullis; pinnis laterali-

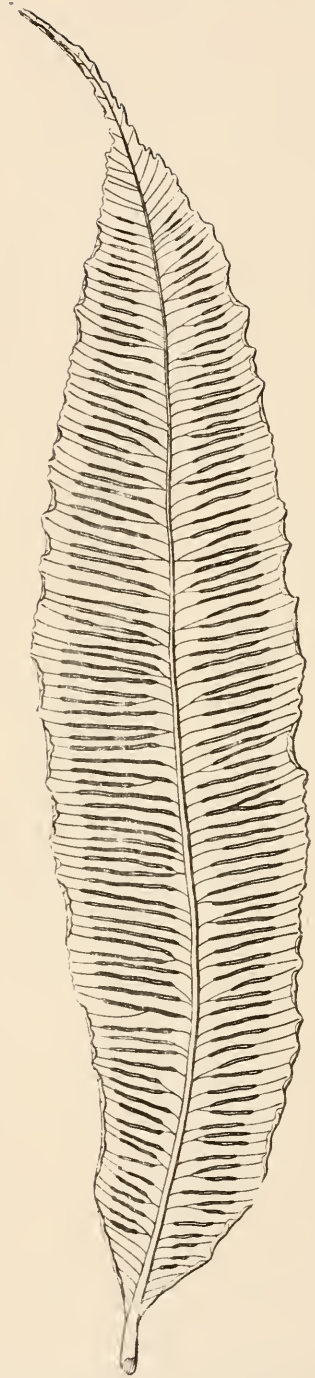


Fig. 60, A pinna of *Archangiopteris Somai* HAYATA  $\times \frac{2}{3}$ .

bus cum terminali conformibus sed paullo minoribus, petiolulis 5-8 mm. longis haud dilatatis haud articulatis haud geniculatis teretibus in exsiccato fuscentibus. Sori lineares 10-12 mm. longi secus venulas siti; sporangiis 60-70 2-seriatim dispositis, sub soris pilis sparce sitis; costa pinnæ utraque pagine plus minus elevata.

HAB. Urai, leg. T. SŌMA et B. HAYATA, Mai. 1916.

Resembles *Archangiopteris Henryi* CH. et GIES. in having simply pinnate fronds with linear sori; but differs from it by the much shorter and not tumid petioles of the pinnæ, in the very much longer apical tails of the latter, in the geniculate stipes with stipules at their very base, and in the less hairy sori which in our species are located much nearer to the costa than to the margin. Our species is, as a whole, much nearer to *Angiopteris* than *A. Henryi* is to the latter. The resemblance of our new fern with a simple pinnate form of *Angiopteris erecta* in its young stage is really very remarkable. The form of the stipules and the geniculation of the stipes are very similar in the two.

### Cyatheaceæ.

There are in Formosa four genera belonging to this family. *Dicksonia* and *Cibotium* are distinctly distinguished from the other genera even in sterile specimens. *Cyathea* and *Alsophila* are on the other hand much confused in the field, when they are not in fertile specimens. Eight species of *Alsophila* are recorded from Formosa, while *Cyathea* is represented only by one, *C. spinulosa* WALL. As far as I can judge from my field-knowledge, there exist in Formosa only three species of *Alsophila* and one species of *Cyathea*,—i. e. *A. formosana*, *A. podophylla*, *A. latebrosa* and *C. spinulosa*. The first two species are distinguishable from the others by the much shorter stems not marked by the leaf-scars. *A. formosana* is the smallest and usually stemless with quite smooth stipes, while *A. podophylla* is a little larger with stems usually  $\frac{1}{2}$ -1 m. long and very muricate stipes. *A. latebrosa* is the largest, its stems being marked very distinctly with leaf-scars and 2-20 m. tall, its fronds being ovate-oblong 260-400 cm. long 145 cm. broad, and its stipes being 15 cm. long, nearly smooth or very slightly muricate and covered with numerous white long soft scales at the base, while *Cyathea spinulosa* is a little

smaller than the preceding species, its stems being also marked with leaf-scars and 1-4 m. tall, its frond ovate-oblong 170-200 cm. long, 85 cm. broad, and its stipes 40-50 cm. long and very aculeate at the base. These four species are widely distributed in the island from Kōshū northwards to Kelung. They are all that I know from Formosa. As to the other species recorded from the island, *A. contaminans*, *A. pastulosa* and *A. tomentosa* are presumably forms of *A. latebrosa*. *A. subglandulosa* HANCE is very likely a species of *Dryopteris*, as far as I can conjecture from a drawing made by myself in the British Museum from the original specimen preserved there; and finally *Alsophila denticulata* BAKER mentioned in Journ. Bot. (1885) p. 102 and MATSUM. et HAYATA Enum. Pl. Formos. p. 571, is very likely a species belonging also to *Dryopteris*. So far as I am aware, we have never seen so small a tree-fern as the latter species described as "stipe about a foot long; frond ovate-deltoid, 1½ ft. long, tripinnatifid, but fertile also in a bipinnate form."

### Polypodiaceæ.\*

#### *Athyrium* ROTH.

***Athyrium cryptogrammoides*** HAYATA sp. nov. Rhizonia ignotum. Stipes 10-25 cm. longus stramineus basi sparse squamatus, squamis lanceolatis castaneis apice acuminatis 5 mm. longis 1 mm. latis basi haud contractis. Frons in ambitu oblonga 30 cm. longa 15 cm. lata apice acuminatissima basi obtusa tripinnata, pinnis mediis alternis 10 cm. longis 3 cm. latis in ambitu lanceolatis apice acuminatissimis basi obtusissimis, pinnulis ordinis I. mediis oblique triangulari-lanceolatis 2 cm. longis 7 mm. latis apice obtusis basi oblique truncatis, pinnulis ordinis II. infimis longissimis, mediis obovatis 5 mm. longis 2 mm. latis apice obtusis basi oblique cuneatis pinnatifidis, lobis utroque latere circ. 2 linearibus-oblongis 1 mm. longis ⅔ mm. latis basi haud contractis apice acutis vel obtusis 1-nerviis, nervis simplicibus haud furcatis prope apicem attingentibus. Sori basi loborum pinnularum ordinis II. singulariter siti. Indusium lineare reniforme vel cordatum 1-½ mm. longum ⅔ mm. latum margine cerosum. Textura chartacea vel chartaceo-coriacea; pinnæ a rhachibus

\* For convenience sake, the genera under this family are arranged in alphabetical order.

frondis angulo circ.  $45^{\circ}$  agressæ ascendentes, mediis longissimis superioribus gradatim minoribus versus apicem ad lobos acuminium abeuntibus; acuminibus frondis lineari-filiformibus utroque latere lobis remotis instructis; pinnis mediis a se  $2\frac{1}{2}$  cm. remotis, pinnulis ordinis I. mediis a se 10–8 mm. remotis, pinnulis ordinis II. a se 2–3 mm. distantibus. Rhachis frondis subteres vel semi-teres straminea 1 mm. in diametro supra sulcata glabra; rhachis pinnarum ordinis I. gracillima  $\frac{1}{3}$  mm. in diametro semi-teres glabra; rhachis pinnularum ordinis II.  $\frac{1}{3}$ – $\frac{1}{2}$  mm. lata plus minus complanata supra profunde sulcata secus sulcum setulosa, setulis erectis 1 mm. longis validiusculis a se  $1$ – $1\frac{1}{2}$  mm. remotis.

HAB. Gokwanzan, leg. YADA, Dec. 1914.

Remarkable for the very narrow linear segments and pinnulis.

*Blechnum* Linn.

***Blechnum* (*Blechnidium*) *plagiogyriifrons* HAYATA sp. nov. (Pl. XX.)**

Rhizoma longe horizontaliter repens teres gracile, squamis dense obtectum, squamis castaneo-coloratis ovato-lanceolatis 5 mm. longis 1 mm. latis apice acuminatis vel filiforme-acuminatis ad summum obtusis basi subcordatis vel rotundatis margine subintegris. Stipes gracilis distans 20 cm. longus cum fronde æquilongus supra tenuiter sulcatus subteres supra pallidus subtus purpurascens basi squamatus cæterum toto glaber. Frons ovato-lanceolata 20–27 cm. longa 7–9 cm. lata ad rhachin pinnatifida, lobis vel segmentis approximatis linearibus, pinnis inferioribus prope medium longissimis  $3\frac{1}{2}$ –5 cm. longis basi 8–11 mm. latis basi latissimis falcatis recurvis apice acutis margine integris, superioribus gradatim minoribus ad lobum terminalem abeuntibus, lobo terminali 3–5 cm. longo lineari-acuminato integro vel undulato; segmentis inferioribus prope basin frondis abrupte minoribus ad auriculas abeuntibus, auriculis utroque latere basis frondis 2–3 vel 4 semi-rotundatis 3–8 mm. longis et latis; pagina tenuiter coriacea utraque glabra supra atro-viridis subtus pallidissima vix vel haud nitida, costa frondis supra elevata tenuiter sulcata subtus elevata, costis segmentorum supra tenuissime elevatis vel impressis subtus elevatis, venis venulis reticulatis. Sori utroque latere costæ pinnae secus costam approximativè siti lineares, a rhachi costæ frondis 2 mm. remotis et ab apice pinnarum  $1\frac{1}{2}$  cm. distantes. Indusium lineare  $1\frac{1}{2}$  mm. latum margine erosum vel denticulatum; pinnae ad marginem subito tenuiores deorsum recurvæ.



HAB. Inter Ushōkō et Arisan, ad 7000 ped. alt., leg. B. HAYATA, Aprili. 1916.

Near *Blechnum melanopum* (Hook. Sp. Fil. III. p. 64 t. CLXI.); but slightly different from it in having less anastomosing veins. In appearance, the present species is very like sterile fronds of *Plagiogyria falcata* which grow on rocks with the new fern.

***Cyclophorus* DESV.**

***Cyclophorus Sasakii* HAYATA sp. nov.** (Fig. 61). Rhizoma repens teres gracile primum versus apicem densissime squamatum, (squamis castaneis

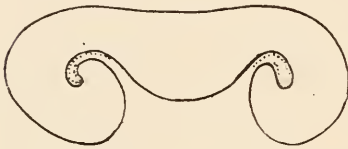


Fig. 61, Cross section of a frond of *Cyclophorus Sasakii* HAYATA.

lineari-lanceolatis 5–6 mm. longis  $\frac{1}{2}$  mm. latis apice acuminatissimis basi rotundatis peltatim insertis, basi ad extremitatem pance fimbriatis vel laud fimbriatis), demum subglabratum 1 mm. in diametro sectionis remote frondigerum.

Frons a se circ. 1 cm. distans subsessilis vel brevissime tipitata lineari-lanceolata  $3\frac{1}{2}$  cm. longa 3 mm. lata apice obtusa basi ad stipitem abeuns margine integerrima valde deorsum usque ad costam convoluta-recurva supra medio impresso-sulcata, supra glabra subtus stellato-pilosa. Textura crassissima. Sori ignoti.

HAB. Shintiku : Karizenzan, leg. S. SASAKI, Jan. 1916.

Very near *Polypodium angustissimum* BAKER. Undoubtedly our plant belongs to the same section with that species.

***Dryopters* ADANS.**

***Dryopteris Sasakii* HAYATA n. n.**

*Dryopteris tenuifrons* HAYATA Ic. Pl. Formos. IV. p. 184 (non C. CH.):

***Dryopteris woodsii*sora HAYATA sp. nov.** Rhizoma ascendens crassum dense squamatum. Stipes 4–5 cm. longus dense squamatus, squamis stramineis lineari-lanceolatis circ. 1 cm. longis  $1-1\frac{1}{2}$  mm. latis apice acuminatissimis margine aristis brevissimis minutis remote instructis. Frons in ambitu ovato-lanceolata apice acuminata basi obtusa vel truncata 9 cm. longa  $3\frac{1}{2}$ –4 cm. lata pinnata, pinnis divaricatis a rhachi frondis angulo  $90^\circ$  egressis, superioribus gradatim minoribus, pinnis infra medium sitis longissimis lineari-triangularibus 18 mm. longis 8 mm. latis apice obtusissimis basi truncatis brevissime



stipitatis pinnatifidis, lobis oblongis apice truncatis dentatis latere margine integris; textura herbacea chartacea; rhachis brevis squamato-hirsuta; pagina frondis sub microscopio minute glanduloso-hirsuta. Sori reniformes  $1\frac{1}{4}$  mm. longi  $1\frac{1}{2}$  mm. lati basi profunde cordati sacciformes et pulvini-formes, ad sinus inter pinnarum lobos siti.

HAB. in rupibus Arisan, ad 2500 m. alt., leg. U. FAURIE, Junio 1914. No. 518.

*Humata* CAV.

**Humata dryopteridifrons** HAYATA sp. nov. Rhizoma ignotum. Stipes circ. 30 cm. longus glaberrimus haud squamatus teres supra stramineus subtus castaneo-coloratus. Frons lanceolato-ovata circ. 23 cm. longa 10 cm. lata apice acuminata basi obtusa vel rotundata basi tripinnata sursum bipinnata, pinnis infimis triangulari-lanceolatis 10 cm. longis 3 cm. latis apice acuminatis basi latissimis truncatis bipinnatis, pinnulis ordinis I. infimis longissimis superioribus gradatim brevioribus versus apicem ad lobos abeuntibus, pinnulis ordinis I. infimis exterioribus longissimis 23 mm. longis 13 mm. latis triangulari-lanceolatis apice obtusissimis basi triangulari-acutis pinnatis, pinnulis ordinis II. infimis interioribus obovatis 1 cm. longis 7 mm. latis apice obtusissimis basi cuneatis margine lobulatis, lobulis obtusis; pinnis petiolatis, petiolis infimis 1 cm. longis, pinnulis ordinis I. petiolulatis, petiolulis 3 mm. longis, pinnulis ordinis II. subsessilibus; pinnis alternis mediis a se  $3\frac{1}{2}$  cm. remotis a rhachibus frondis, pinnulis a rhachibus pinnarum angulo  $45^\circ$  egressis. Textura membranacea glabra, pagine supra ad sorum rotundato-elevata. Sori ad apicem loborum lateris superioris vel infra sinus inter lobos lateris superioris siti; indusium depresso-rotundatum 2 mm. latum  $1\frac{2}{3}$  mm. longum integrum basi contractum ad insertionem 1 mm. latum.

= *Davallia dryopteridifrons* HAYATA.

HAB. Arisan, ad 2500 m. alt., leg. U. FAURIE, Junio 1914. (No. 615).

Remarkable for the broad lobes of the pinnules of the very thin texture.

*Monachosorum* KUNZE.

**Monachosorum Maximowiczii** (BAK.) HAYATA Tokyo Bot. Mag. (1909) p. 2; KODAMA in MATSUM. Ic. Pl. Koishikaw. I. p. 29 t. 15; *Polypodium Maximowiczii* BAK. Syn. Fil. p. 504; *Polystichum Maximowiczii* DIELS

Nat. Pfl. Fam. I.-4, p. 189.

Var. **melanocaulon** HAYATA n. v. = *Polystichum Maximowiczii* var. *melanocaulon* HAYATA. Textura quam typō crassiora; stipites nigro-purpureascentes.

HAB. Nōkōzan, Aprili. 1916.

***Polypodium* LINN.**

***Polypodium suisha-stagnale* HAYATA sp. nov.** Rhizoma repens teres 6 mm. in diametro sectionis viride adpresse squamatum, squamis fulvis ovato-oblongis 5 mm. longis 2 mm. latis apice acutis vel obtusis basi peltatim cordatis vel profunde cordatis, lobis cordis imbricatis, margine erosis vel remote eroso-setulosis. Stipes erectus 65 cm. longus stramineus nitidus. Frons lanceolato-linearis 60 cm. longa 18 cm. lata pinnati-fida vel subpinnata, pinnis infimis longissimis superioribus gradatim minoribus, pinnis lateralibus superrimis minimis, pinna terminali longiore; pinnis lateralibus linearibus infimis 14 cm. longis 18 mm. latis apice obtusis vel acuminatis; pinna terminali lineari 10 cm. longa 13 mm. lata margine subintegra; pinnis a rhachi frondis angulē 45° egressis utraque pagine glabris costis et venis supra minus subtus plus elevatis; costa frondis utraque elevata haud sulcata, alis angustissimis 2-3 mm. latis; frons a medio sursum sorifera. Sori rotundati 2 mm. in diametro supra valde elevati, subtus valde impressi 1½ mm. profundi; receptaculum 1 mm. in diametro tenuiter elevatum.

HAB. in stagnis Suisha, leg. B. HAYATA, Aprili. 26, 1916.

The present new fern was found in a very boggy place in a floating island in Suisha-lake. Very near *P. longissimum* BLUME, but distinguishable from it by the thinner texture and by the deeper sunken sori.

***Vittaria* SM.**

Key to the Formosan Species of *Vittaria*.

1. Sori sunk in a two-lipped marginal groove (§ *Euvittaria*) ..... 2  
     Sori in a slightly intramarginal line, with the unaltered edge of the  
     frond produced beyond and often rolled over it (§ *Teniopsis*) .. 4
2. Fronds usually pendulous, very long usually over 30 cm., some-  
     times attaining to 1 m. or even more..... 3  
     Fronds usually erect more or less recurved at most 30 cm. long. 2-3

- mm. broad ..... *V. anguste-elongata*  
 3. Fronds not tortuous. .... *V. elongata*  
     Fronds usually tortuous. .... *V. tortifrons*  
 4. Fronds very narrow, usually 30 cm. long 2 mm. broad ; sorus on the  
     middle between margin and costa. .... *V. mediosora*  
     Fronds 4–8 mm. broad 40–80 cm. long, sori located near the margin. . 5  
 5. Fronds pendulous, scales brownish ..... *V. arisanensis*  
     Fronds suberect, scales much darker ..... *V. suberecta*

***Vittaria anguste-elongata* HAYATA sp. nov. = *Vittaria* sp. HAYATA Ic.**

Pl. Formos. V. p. 346, fig. 149-a. Epiphytica ad truncos arboris crescens. Rhizoma dense squamatum dense frondigerum, squamis castaneo-fuscentibus 4–6 mm. longis basi  $\frac{1}{2}$  mm. latis linearibus basi latissimis  $\frac{1}{2}$  mm. latis apice subulato-acuminatis margine remote setulosis. Stipes supra subnullus subtus complanatus basi squamatus. Frons longissime linearis usque ad 30 cm. longa usque ad 3 mm. lata apice acuminatissima basi gradatim attenuata glabra margine integra margine haud vel vix recurva glabra. Textura chartaceo-coriacea, costa supra vix vel distincte elevata subtus plana haud elevata vel plus minus impressa. Sori ad sulcos marginales siti.

HAB. Urai, Suisha, Kelung, Giran, Sōseikyaku.

Near *V. elongata* Sw. ; but separable from it in the much smaller fronds which are usually more or less tortuous, and in the scales which are brownish and less dark than those of *V. elongata*.

***Vittaria elongata* Sw. ; MATSUM. et HAYATA Enum. Pl. Formos. p. 625.**

HAB. Kaukaukei, Botansha, Suiteiryō, Urai, Randaisan.

***Vittaria suberecta* HAYATA sp. nov. *Vittaria* sp. No. III. Ic. Pl. Formos. V. p. 347 fig. 149 j-k. Epiphytica ad truncos arboris crescens suberecta plus minus curvato-descendens. Rhizoma cum basibus stipitum dense squamatum, squamis persistentibus fusco-nigricantibus lineari-lanceolatis 2 mm. longis apice subulato-acuminatis margine remote setulosis, dense frondigerum. Stipes atro-purpureus basi dense squamatus sursum glaber brevissimus sub-tetragonus supra sulcatus. Frons longissime linearis 20–50 cm. longa  $3\frac{1}{2}$ –8 mm. lata apice acuminatissima basi gradatim attenuata ad stipitem brevissimum**

abaeus margine integerrima in exsiccatō deorsum recurva utraque pagine glaberrima, costa supra impressa subtus prominente elevata; textura crassa in exsiccatō valde coriacea, venis laud visis. Sori intramarginales. *Vittaria lanceola* HAYATA in MATSUM. et HAYATA Enum. Pl. Formos. p. 625 (non CHRIST).

HAB. Musha Oiwake, ad 7000 ped. alt., leg. B. HAYATA, Aprili. 1916; Mingetsu; Arisan, inter Keitao et Goshōrin; Gōkwanzan, Urai.

Near *V. japonica*, but differs from it in the much thicker fronds and in the cellular structure of the scales which are a little darker than those of *V. japonica*.

**Vittaria tortifrons** HAYATA sp. nov. Epiphytica; rhizoma repens longissimum dense squamatum, squamis lanceolato-filiformibus 5–7 mm. longis nigricantibus basi ovatis vel ovato-cordatis 1 mm latis medio linearibus versus apicem filiformibus basi versus longitudinem exteriore plicatis margine remote serrulatis. Stipes 10–20 cm. longus. Frons longissime linearis verticaliter pendula usque ad 220 cm. longa 10–13 mm. lata apice basique gradatim angustissime acuminata utraque pagine glaberrima manifeste tortuosa, venis lateralibus distincte visis. Sori ad sulcos marginales siti.

HAB. Remogan, leg. B. HAYATA, Mai. 1916; Keitao, Ochōbi, Kusukusu, Taitō: Chihon.

Near *V. scolopendrina* THWAITES, but separable from it in the thinner and narrower fronds which have costa not impressed [but somewhat elevated on both surfaces, and especially by the sori which are in this new species at the marginal groove, but not intra-marginal.

### *Woodsia.*

**Woodsia polystichoides** EAT. Rhizoma brevissimum repens dense frondigerum. Stipes nitidus castaneus vel stramineus dense caespitosus 3–4½ cm. longus deorsum dense squamatus sursum sparse squamatus et eripato-hirsutus, pilis castaneis crispatis, squamis castaneis lanceolatis 2–3 mm. longis ½ mm. latis apice acuminatis margine integris vel fimbriis 1–2 instructis basi cordatis vel peltatis. Frons lineari-lanceolata 5–9 cm. longa 1½–2 cm. lata apice acuminata vel ad summum obtusa basi cum medio æquilata truncata simpliciter pinnata, pinnis mediis linearibus-oblongis 7 mm.–11 mm. longis 2½ mm.–4 mm. latis apice

obtusis basi obliquis, latere inferiore basi fractis cuneato-acuminatis, latere superiore basi truncatis auriculatis latissimis cum rhachi parallelis, auriculis 4 mm. longis 2 mm. latis apice obtusissimis, margine subintegris vel repandis; costa supra impressa subtus tenuissime elevata inconspicua, venis lateralibus utraque pagine haud elevatis indistinctis basi vel medio furcatis, ramis simplicibus apice clavatis prope marginem attingentibus; pagine supra presertim versus costam hirsuta, subtus hirsuta et secus costam squamata, squamis lanceolatis acuminatis 2 mm. longis  $\frac{1}{4}$  mm. latis pilis circ. 1 mm. longis articulatis; textura chartacea. Sori secus marginem pinnarum 1-seriatim dispositi, prope apicem ramorum venarum lateraliter siti depresso-globosi 1 mm. in diametro. Indusium inferum cupuliforme margine lobulato-crosum intus glabrum extus setuloso-pilosum. Rhachis pilosa et squamata, pinnis alternis sessilibus vel subsessilibus mediis a se 8 mm. remotis, a rhachi angulo recto vel obtuso divaricatis, pinnis superioribus gradatim minoribus ad pinnam terminalem minutam abeuntibus.

HAB. Arisan, ad 8000 ped. alt., leg. U. FAURIE, Junio 1914.

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„ Tashiroi HAYATA. .. .	56	„ Morii HAYATA. .. .	28
„ trilobulata HAYATA. .. .	56	<b>Rhynchoglossum</b> BLUME. .. .	34
<b>Peliosanthes</b> ANDR. .. .	94	„ ? Sasakii HAYATA. .. .	34
„ arisanensis HAYATA. .. .	94	<b>Rhynchospora</b> VAHL. .. .	116
„ courtallensis HAYATA. .. .	95	„ longisetigera HAYATA. .. .	116
„ Tashiroi HAYATA. .. .	96	„ glauca VAHL. .. .	116
<b>Phajus</b> LOUR. .. .	74	<b>Rohdea</b> ROTH. .. .	97
„ grandifolius LOUR. .. .	74	„ Watanabei HAYATA. .. .	97
„ maculatus LINDL. .. .	75	<b>ROSACEÆ.</b> .. .	16
„ Somai HAYATA. .. .	74	<b>Rubus</b> LINN. .. .	16
<b>Photinia</b> LINDL. .. .	17	„ rarissimus HAYATA. .. .	16
„ lasiopetala HAYATA. .. .	17	<b>RUTACEÆ.</b> .. .	5
<b>Phyllostachys</b> SIEB. et ZUCC. .. .	140	<b>SABIACEÆ.</b> .. .	15
„ formosana HAYATA. .. .	140	<b>Saccolabium</b> BLUME .. .	85
„ lithophila HAYATA. .. .	141	„ formosanum HAYATA. .. .	85
„ nigripes HAYATA. .. .	142	<b>SALICINÆÆ.</b> .. .	65
„ pubescens H. LEHAIE. .. .	140	<b>Salix</b> LINN. .. .	65
„ mitis RIV. .. .	140	„ eriostroma HAYATA. .. .	65
<b>Phyllostachys</b> Makinoi HAYATA. .. .	142	„ suishensis .. .	65
<b>Physurus</b> RICH. .. .	87	<b>Sarcochilus</b> R. BR. .. .	83

<b>Sarcochilus</b> kusukusensis HAYATA. . . . .	83	<b>Tropidia</b> LINDL. . . . .	85
" Saruwatarii HAYATA. . . . .	84	" <i>angulata</i> BLUME. . . . .	86
<i>Sasa nitakayamensis</i> CAMUS. . . . .	137	" Somai HAYATA. . . . .	85
<b>SAXIFRAGACEÆ</b> . . . . .	19	<b>URTICACEÆ</b> . . . . .	43
<b>Scirpus</b> LINN. . . . .	114	<b>Vanilla</b> SW. . . . .	88
" <i>erecto-gracilis</i> HAYATA. . . . .	114	" Somai HAYATA. . . . .	88
" <i>morrisonensis</i> HAYATA. . . . .	115	<b>VERBENACEÆ</b> . . . . .	35
" <i>Sasakii</i> HAYATA. . . . .	115	<b>VIOLACEÆ</b> . . . . .	3
" <i>supinus</i> LINN. . . . .	115	<b>Vignea</b> NEES. . . . .	118
<b>Scleria</b> BERG. . . . .	117	<b>Viola</b> LINN. . . . .	3
" <i>pubigera</i> MAKINO. . . . .	117	" <i>senzanensis</i> HAYATA. . . . .	3
<b>SCROPHULARIACEÆ</b> . . . . .	34	" <i>Tayemoni</i> HAYATA. . . . .	3
<b>Sedum</b> LINN. . . . .	20	<b>Viscum</b> LINN. . . . .	40
" <i>drymarioides</i> HAYATA. . . . .	20	" <i>album</i> LINN. . . . .	39
" <i>uraiense</i> HAYATA. . . . .	20	" <i>Alni-formosanae</i> HAYATA. . . . .	39
<b>SIMARUBEÆ</b> . . . . .	13	" <i>diospyrosicolum</i> HAYATA. . . . .	41
<b>Spiranthes</b> L. C. RICH. . . . .	86	<b>Vittaria</b> SM. . . . .	160
" <i>australis</i> LINDL. var. <i>sui-</i>		" <i>anguste-elongata</i> HAYATA. . . . .	161
<i>shaensis</i> HAYATA. . . . .	86	" <i>elongata</i> SW.; . . . . .	161
<b>STYRACEÆ</b> . . . . .	29	" <i>suberecta</i> HAYATA. . . . .	161
<b>Swertia</b> LINN. . . . .	31	" <i>tortifrons</i> HAYATA. . . . .	162
" <i>Kuroiwai</i> MAKINO. . . . .	31	<b>Vrydagzynthia</b> BLUME. . . . .	88
" <i>shintenensis</i> HAYATA. . . . .	31	" <i>formosana</i> HAYATA. . . . .	88
<b>Symplocos</b> LINN. . . . .	29	<b>Wikstroemia</b> ENDL. . . . .	38
" <i>theifolia</i> HAYATA. . . . .	29	" <i>mononectaria</i> HAYATA. . . . .	38
<b>Tainia</b> BLUME. . . . .	75	<b>Woodsia</b> . . . . .	162
" <i>laxiflora</i> MK. . . . .	77	" <i>polystichoides</i> EAT. . . . .	162
" <i>Shimadai</i> HAYATA. . . . .	75	<b>Zanthoxylum</b> LINN. . . . .	6
<b>TERNSTROEMIACEÆ</b> . . . . .	4	" <i>acanthophyllum</i> HAYATA. . . . .	7
<b>THYMELÆACEÆ</b> . . . . .	38	" <i>cuspidatum</i> CHAMP. . . . .	7
<b>Trigonotis</b> STEV. . . . .	32	" <i>liukiense</i> HAYATA. . . . .	6
<b>Trigonotis</b> <i>elevato-venosa</i> HAYATA. . . . .	32	<b>Zeuxine</b> LINDL. . . . .	89
		" <i>tabiyahanensis</i> HAYATA. . . . .	89



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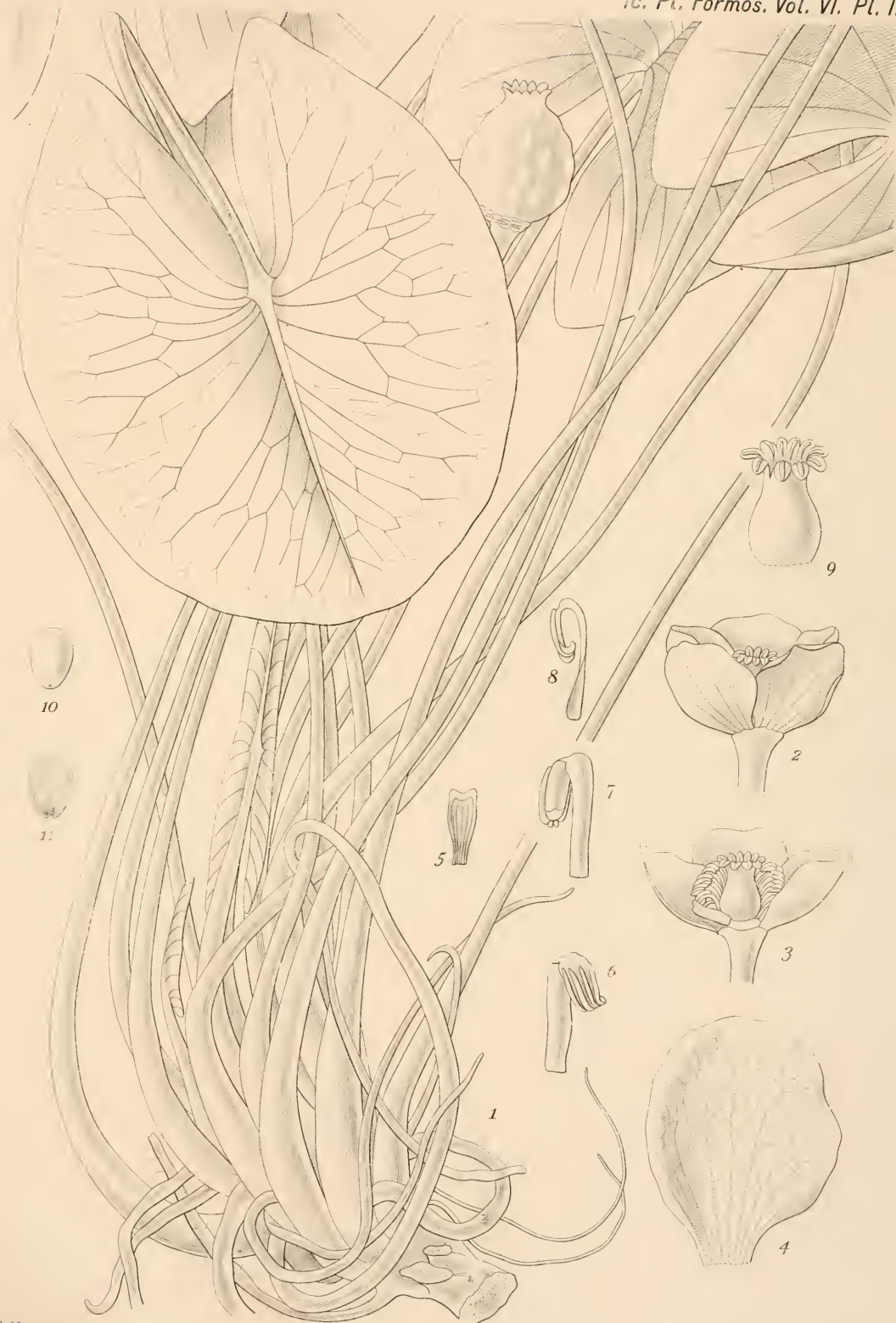
VI.

PLATE I.

## Explanation of Pl. I.

*Nuphar Shimadai* HAYATA.

- Fig. 1. The plant.  
2. A flower.  
3. The same, sepals partly taken off.  
4. A sepal.  
5. A petal.  
6, 7, 8. stamens, seen from different sides.  
9. Ovary.  
10. A seed.  
11. The same in section.





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PLATE II.



## Explanation of Pl. II.

*Meliosma callicarpæfolia* HAYATA.

- Fig. 1. A branch.  
2. A leaf.  
3. A flower.  
4. A bracteole.  
5. A sepal.  
6. A petal.  
7. A flower, sepals and petals taken off, showing stamens and staminodes.  
8, 9, 10. Stamens seen from different sides.  
11. A staminode.  
12. Ovary with disc-glands.





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PLATE III.

### Explanation of Pl. III.

*Corylopsis stenopetala* HAYATA.

- Fig. 1. The plant, natural size.  
2. A flower  $\times 10$ .  
3. A petal  $\times 10$ .  
4, 5. Stamens, seen from different sides  $\times 10$ .  
6. A gland  $\times 10$ .  
7. Ovary  $\times 7$ .  
8. Fruit-bearing spike n. s.  
9. A fruit, n. s.  
10. A seed, n. s.  
11. The same, in section.







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PLATE IV.

**Explanation of Pl. IV.**

*seboricalum*  
*Heptapleurum Sasakii* HAYATA.

- Fig. 1. A branch.  
2. A leaf.  
3. A flower.  
4. The same, petals taken off.  
5. A petal.  
6, 7. Stamens, seen from different sides.







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PLATE V.

## Explanation of Pl. V.

*Lonicera oiwakensis* HAYATA.

- Fig. 1. The plant.
2. A leaf.
3. A portion of the upper surface of a leaf.
4. A portion of the lower surface of a leaf.
5. Pair of flowers.
6. The same seen from back.
7. A flower seen from side.
8. Ovaries and a style.
9. Corolla expanded.
- 10, 11. Stamens, seen from different sides.
12. Ovary in vertical section.
13. A portion of the outer surface of the corolla-tube.



F. Hayami del.

Y. Nakazawa sculp.





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PLATE VI.

## Explanation of Pl. VI.

*Chrysanthemum arisanense* HAYATA.

- Fig. 1. The plant.  
2. A leaf.  
3. An outer involueral bract.  
4. An inner involueral bract.  
5. A marginal flower.  
6. Apical portion of the style.  
7. Basal portion of the same style with the achene.  
8. A disc-flower.  
9. The same, corolla and stamens taken off.  
10. Corolla expanded and stamens.  
11. Stamens expanded.  
12. An embryo.  
13. The same, one of the cotyledons taken off.





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PLATE VII.



## Explanation of Pl. VII.

*Anodendron suishense* HAYATA.

- Fig. 1. The plant.  
2. A leaf.  
3. A flower.  
4. A bracteole.  
5. Sepals and ovary with disc-glands.  
6. Corolla expanded, showing stamens.  
7, 8, 9. Stamens, seen from different sides.  
10. Disc-glands, expanded.  
11. Style.  
12. A carpel of the ovary.





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PLATE VIII.

### **Explanation of Pl. VIII.**

*Cyclostemon hieracense* HAYATA.

- Fig. 1. A branch.  
2. A leaf.  
3. A male flower.  
4. Discs in the center of a flower.







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PLATE IX.

## Explanation of Pl. IX.

*Pilea kankacensis* HAYATA.

- Fig. 1. The plant.  
2. A leaf.  
3. A portion of male inflorescence.  
4. A male flower-bud.  
5. A male flower.  
6, 7. Sections of a tube of a perianth taken from different flowers.  
8. A perianth-lobes with a stamen.  
9. A portion of female inflorescence.  
10. A female flower.  
11, 12. A perianth-lobes of a female flower, seen from different sides.  
13. Cystoliths on a leaf  $\times 13$ .







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PLATE X.

### Explanation of Pl. X.

*Carpinus rankanensis* HAYATA.

- Fig. 1. A branch.  
2. A bract on the peduncle.  
3. A fructiferous bract, seen from the inner side.  
4. The same, seen from the outer side.  
5. A premature achene.  
6. The same, in section.







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PLATE XI.

## Explanation of Pl. XI.

*Microstylis arisanensis* HAYATA.

- Fig. 1. The plant.  
2. A flower.  
3. A dorsal sepal.  
4. A lateral sepal.  
5. A petal.  
6. A labellum.  
7. The same, seen from side.  
8. The same, in cross section.  
9. Column.  
10. The same, seen from side.  
11. A pollinium.





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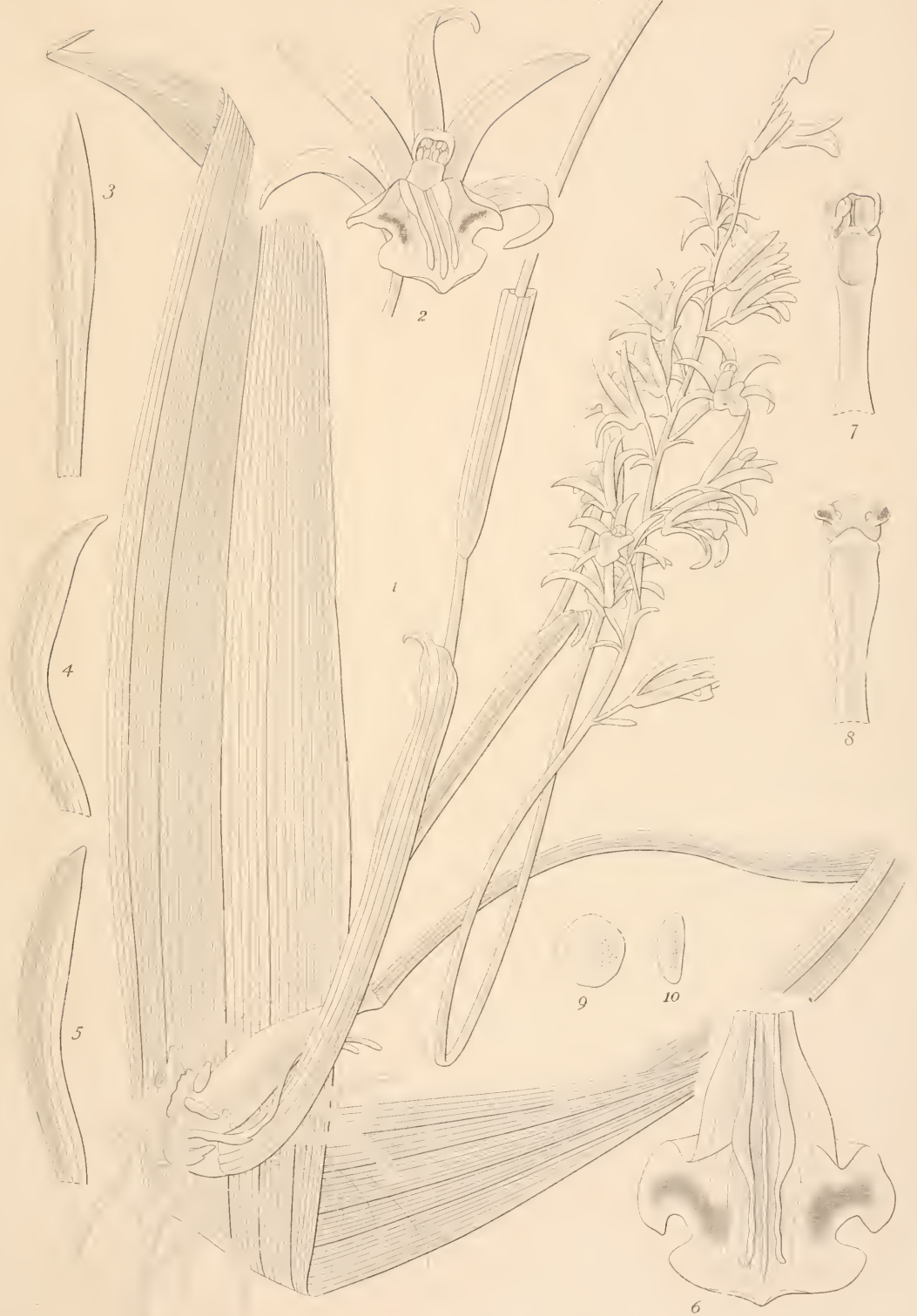
PLATE XII.



## Explanation of Pl. XII.

*Tainia Shimadai* HAYATA.

- Fig. 1. The plant.  
2. A flower.  
3. A dorsal sepal.  
4. A lateral sepal.  
5. A petal.  
6. A lip.  
7. A column with the operculum.  
8. The same, seen from dorsal side.  
9. A pollinium.  
10. The same, seen from side.





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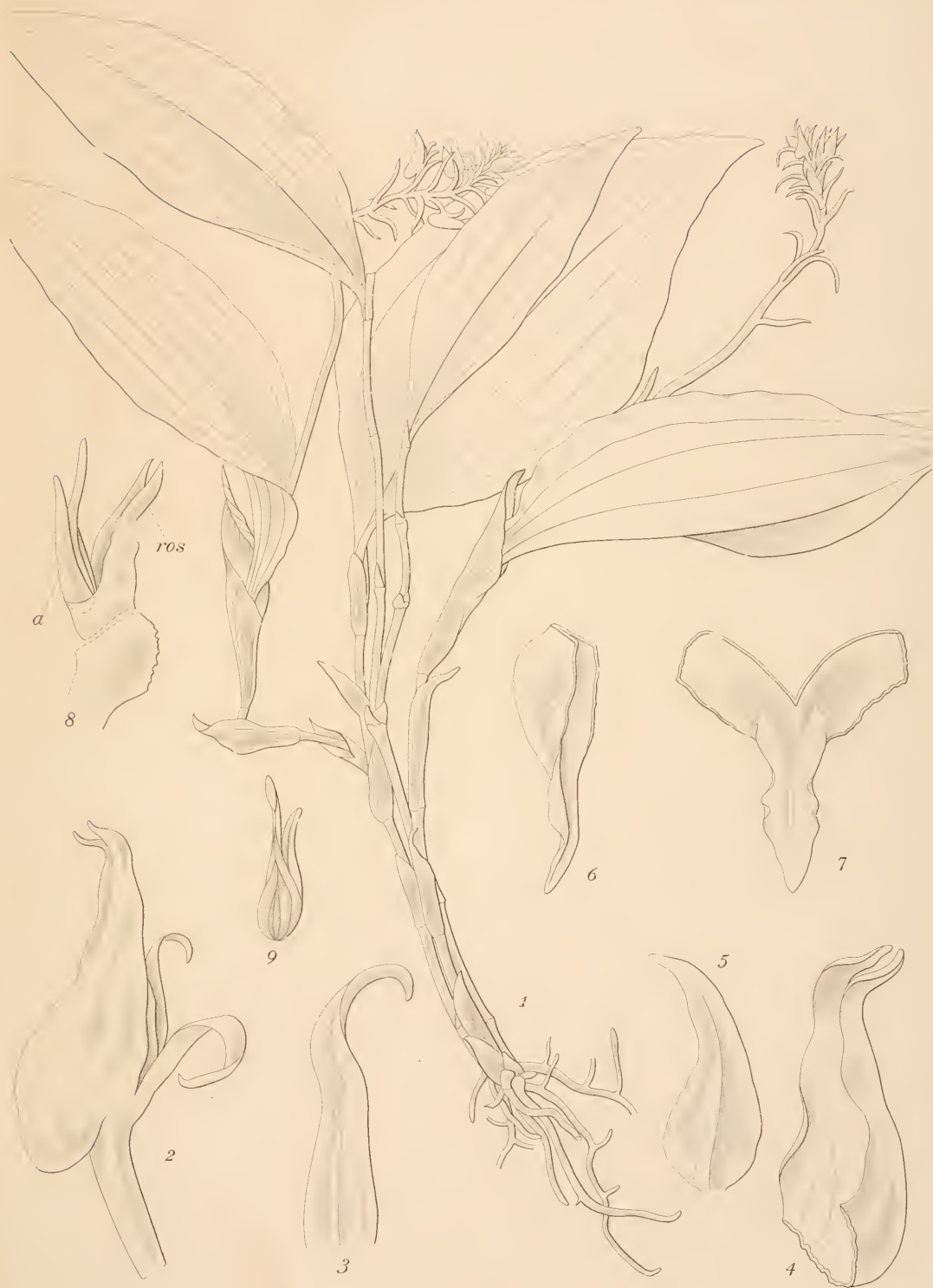
PLATE XIII.

### Explanation of Pl. XIII.

*Tropidia Somai* HAYATA

- Fig. 1. The plant.  
2. A flower.  
3. A backward sepal.  
4. Two lateral sepals.  
5. A petal.  
6. A lip, seen from side.  
7. The same, basal portion cut and expanded.  
8. A column ; ros.=rostellum ; a=anther.  
9. An anther with po inia.







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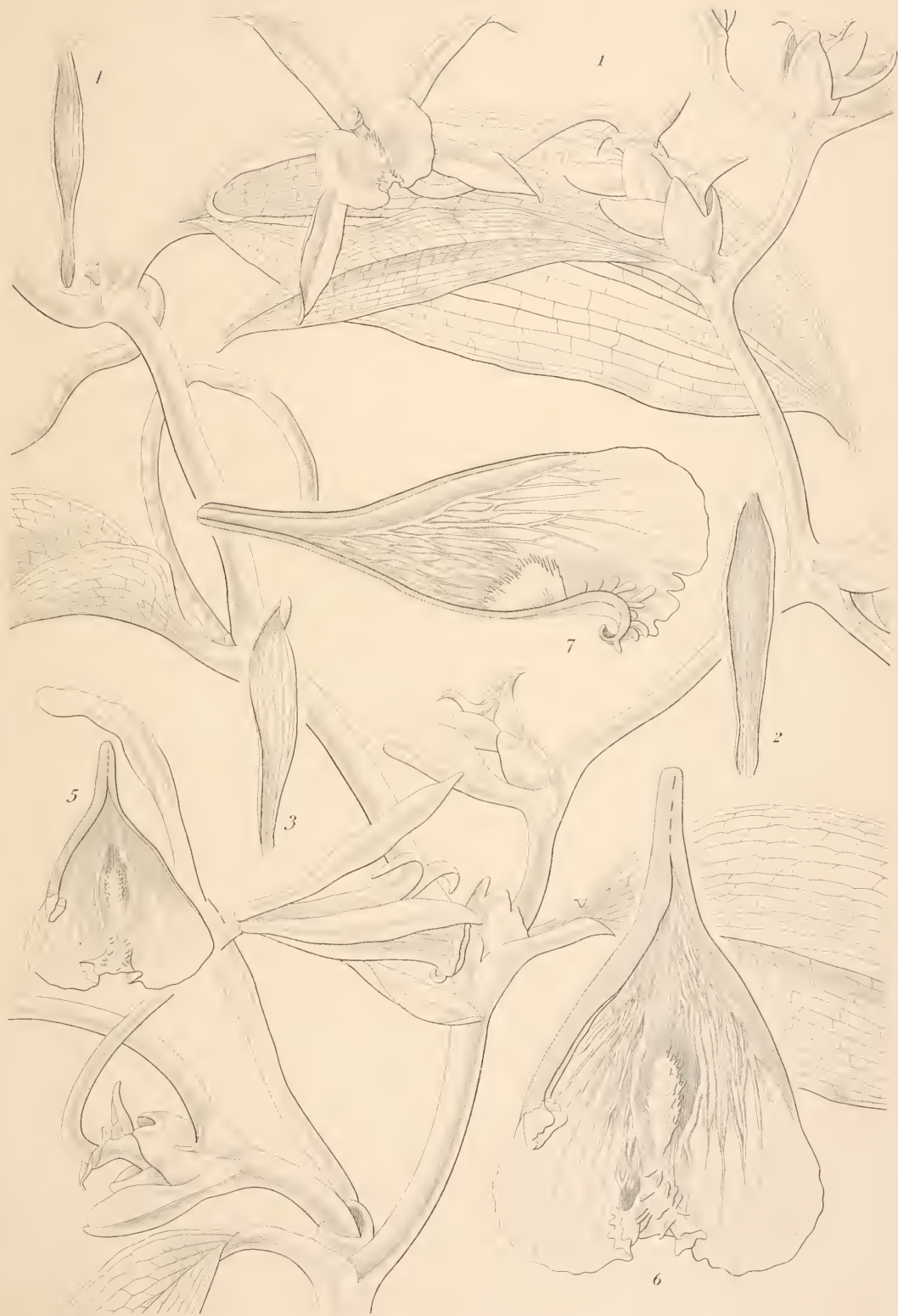
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PLATE XIV.

### Explanation of Pl. XIV.

*Vanilla Somai* HAYATA.

- Fig. 1. The plant, n. s.  
2. A backward sepal, n. s.  
3. A lateral sepal, n. s.  
4. A petal, n. s.  
5. A lip, n. s.  
6. The same, magnified.  
7. The same, in vertical section.







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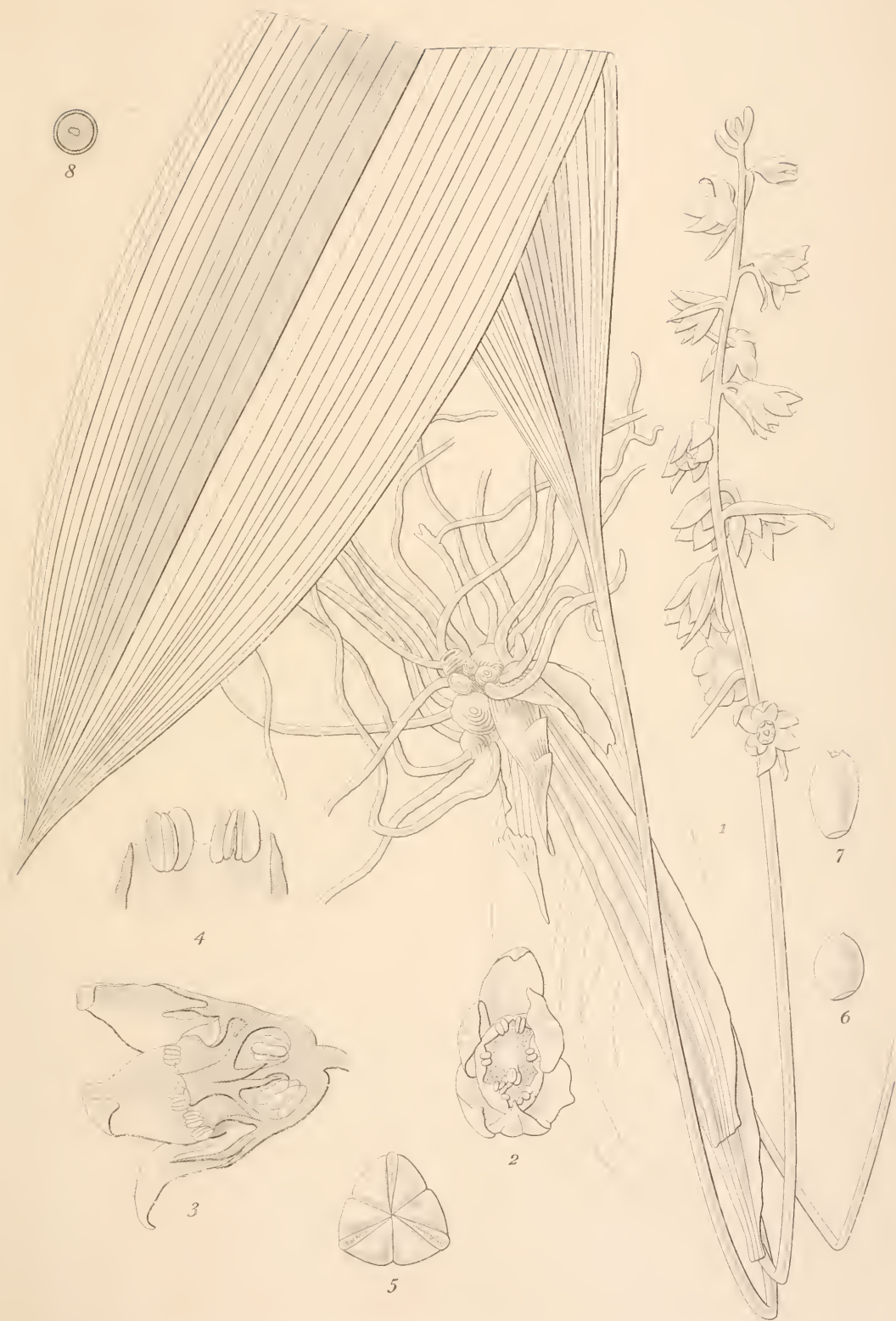
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PLATE XV.

### **Explanation of Pl. XV.**

*Peliosanthes arisanensis* HAYATA.

- Fig. 1. The plant.  
2. A flower.  
3. The same in vertical section.  
4. A portion of a staminal tube, showing two anthers.  
5. A stigma.  
6, 7. Seeds.  
8. Cross section of a seed.





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PLATE XVI.



## Explanation of Pl. XVI.

*Rohdea Watanabei* HAYATA.

- Fig. 1. The plant.  
2. A flower,  $\times 3$ .  
3. The same in vertical section,  $\times 4$ .  
4. An interior lobe of the perianth,  $\times 6$ .  
5, 6. Stamens seen from different sides,  $\times 6$ .  
7. Ovary, seen from top,  $\times 6$ .  
8. Cross section of ovary with perianth-tube.  
9. A fruit, n. s.  
10, 11, 12. Seeds, seen from different sides,  $\times 3$ .





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PLATE XVII.

## Explanation of Pl. XVII.

*Carex satsumensis* FR. et SAV. var. *longiculma* HAYATA.

- Fig. 1. The plant.  
2. Spikelet.  
3. A bract at the base of a spikelet.  
4. A cladoprophyllum.  
5. The same, seen from side.  
6. A scale of a female flower.  
7. An utricel.  
8. A nutlet.  
9, 10. Other forms of nutlets.  
11. A male flower.  
12. Cross section of a nutlet.







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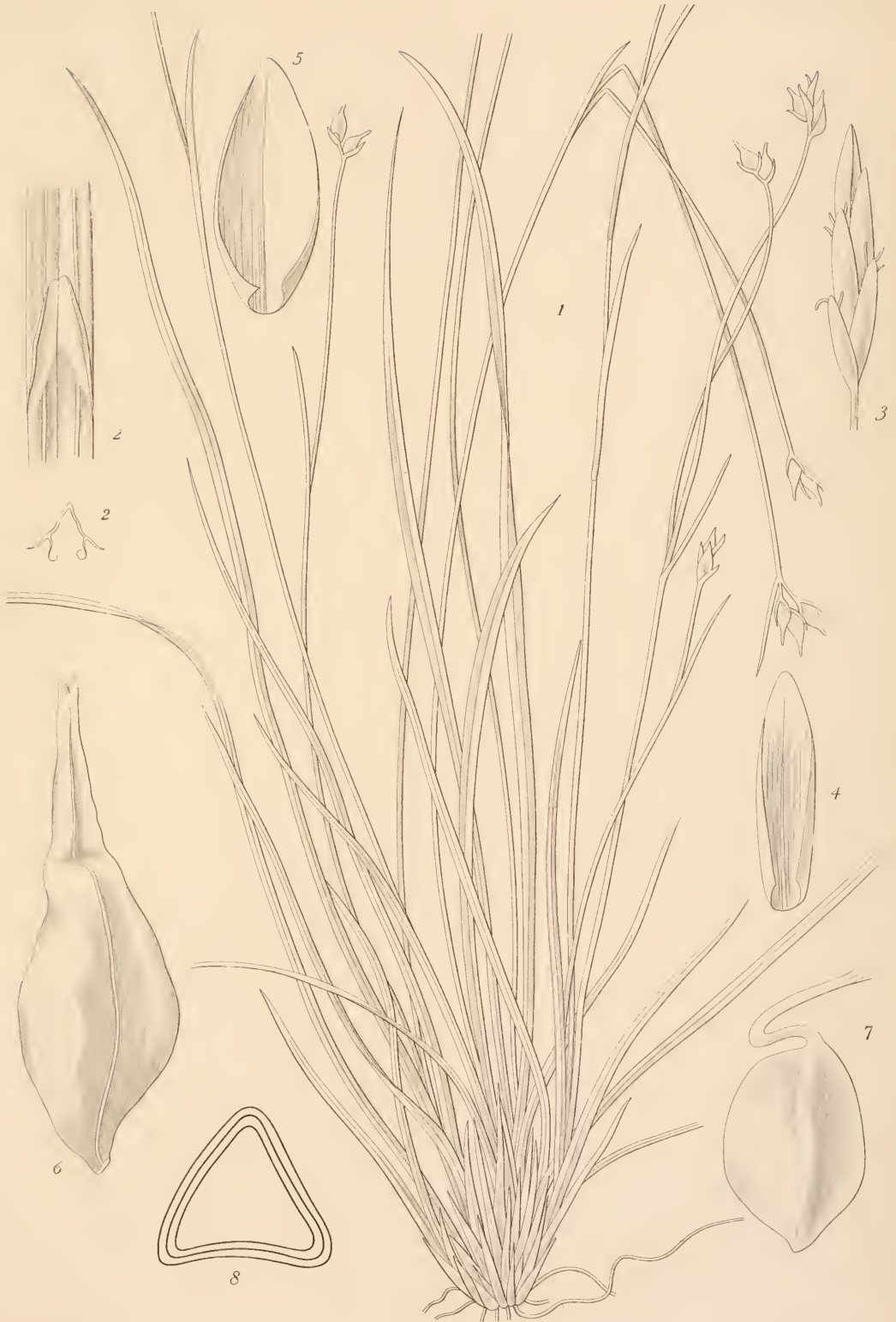
VI.

PLATE XVIII.

**Explanation of Pl. XVIII.**

*Carex arisanensis* HAYATA.

- Fig. 1. The plant.  
2. A portion of a leaf, showing a ligule.  
2'. A section of the same portion.  
3. A male spikelet, anthers fallen off.  
4. A glume of a male flower.  
5. A glume of a female flower.  
6, 7. Utricles seen from different sides.  
8. Section of the same.  
9. A nutlet.





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PLATE XIX.



### **Explanation of Pl. XIX.**

*Archangiopteris Somai* HAYATA.

- Fig. 1. The plant.  
2. A scale.  
3. A sorus.  
4, 5. Sporangia.  
6. A hair of an indusium.



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PLATE XX.



## Explanation of Pl. XX.

*Blechnum plagiogyriifrons* HAYATA.

- Fig. 1. The plant.  
2. A scale on the rhizoma.  
3. A pinna, indusium and sporangia taken off, showing venation.  
4, 5. Basal and apical portion of a pinna.  
6. Cross section of a fertile pinna.  
7. Portion of the same section, showing the receptaculum.

